Extreme Networks Policy Manager (EPM) Supervisor Edition - User Guide

Version 1.2

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Preface

This preface introduces this user guide, describes guide conventions, and lists other useful publications.

Introduction

This guide provides the required information to use the Extreme Networks Policy Manager (EPM) - Supervisor Edition software. It is intended for use by network administrators who are responsible for monitoring and managing Local Area Networks and assumes a basic working knowledge of:

- Local Area Networks (LANs)
- Ethernet concepts
- Ethernet switching and bridging concepts
- Routing concepts
- Access Control Lists (ACLs)
- CLEAR-Flow

NOTE

If the information in a Release Note differs from the information in this User Guide, the Release Note takes precedence.

Conventions

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1: Notice Icons

Icon	Notice Type	Alerts you to...
	Note	Important features or instructions.
	Caution	Risk of unintended consequences or loss of data.
	Warning	Risk of permanent loss of data.

Table 2: Text Conventions

Convention	Description
`Screen displays`	This typeface represents information as it appears on the screen.
Screen displays bold The words "enter" and "type"	This typeface indicates how you would type a particular command. When you see the word "enter" in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
[Key] names	Key names appear in text in one of two ways. They may be • referred to by their labels, such as "the Return key" or "the Escape key." • written with brackets, such as [Return] or [Esc]. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). For example: Press [Ctrl]+[Alt]+[Del].
Words in bold type	Bold text indicates a button or field name.
Words in *italicized* type	Italics emphasize a point or denote new terms at the place where they are defined in the text.

Related Publications

Other manuals that you will find useful are:

- *ExtremeXOS Concepts Guide*
- *ExtremeXOS Command Reference Guide*

For documentation on Extreme Networks® products, and for general information about Extreme Networks, see the Extreme Networks home page:

http://www.extremenetworks.com

Customers with a support contract can access the Technical Support pages at:

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Customers without contracts can access manuals at:

http://www.extremenetworks.com/services/documentation/

1 Overview

Introduction

This chapter describes the following sections:

- Description of the Extreme Networks Policy Manager on page 9
- About This Manual on page 10
- Editions of the EPM on page 10

Description of the Extreme Networks Policy Manager

The Extreme Networks Policy Manager (EPM) is a client application for the configuration and management of Access Control Lists (ACLs) and Continuous Learning, Examination, Action and Reporting of Flows (CLEAR-Flow or CF) on EXOS-based Extreme Networks switches. It is a GUI-based software download designed to simplify the management process.

ACLs are used to perform packet filtering and forwarding decisions on traffic traversing the switch. Each packet arriving on an ingress port and/or VLAN is compared to the access list applied to that interface and is either permitted or denied. ACLs are typically applied to traffic that crosses Layer 3 router boundaries, but is possible to use access lists within a Layer 2 virtual LAN (VLAN).

CLEAR-Flow is an extension to ACLs that implements security, monitoring, and anomaly detection in Extreme XOS software. ACL policy rules are created to count packets of interest. CLEAR-Flow rules are added to the policy to monitor the ACL counter statistics for situations of interest in the individual network. Such situations can include: the cumulative value of a counter; the change to a counter over a sampling interval; the ratio of two counters; or even the ratio of the changes of two counters over an interval. For example, monitoring the ratio between TCP SYN and TCP packets might show an abnormally large ratio which may indicate a SYN attack.

The counters used in CLEAR-Flow are either defined by the user in an ACL entry, or can be a predefined counter. Refer to a list and description of these counters in Appendix A on page 63.

If the rule conditions are met, the CLEAR-Flow actions configured in the rule are executed. The switch can respond by modifying an ACL that will block, prioritize, or mirror the traffic, executing a set of CLI commands, or sending a report using a SNMP trap or EMS log message.

For additional information about ACLs or CLEAR-Flow refer to the *ExtremeXOS Concepts Guide.*

About This Manual

This manual consists of six chapters, two appendixes and an index, arranged as shown in Table 3.

Table 3: List of Chapters

Chapter	Description
1 - Overview	Describes the Extreme Networks Policy Manager and the User Guide contents.
2 - Installing EPM	Describes the hardware, software and switch requirements, and explains the installation process
3 - Viewing Policies and Rules	Describes procedures for viewing policies and rules locally and through a switch
4 - Creating Policies and Rules	Describes procedures for creating policies and rules
5 - Modifying Policies and Rules	Describes procedures to modify existing policies and rules
6 - Running EPM Examples	Provides two examples to demonstrate capabilities and procedures
Appendix A	Contains help messages and other reference material that appear in the EPM program
Appendix B	Contains suggestions for dealing with problems that may occur when running the EPM
Index	Contains a keyword index to the User Guide

Editions of the EPM

Currently, one edition of the EPM is available—the Supervisor Edition. The Supervisor Edition allows the user the capability to create, modify and save policies either locally or when connected to a switch. In this User Guide, the terms EPM and Extreme Networks Policy Manager always refer to the Supervisor Edition.

2 Installing The Extreme Networks Policy Manager

Introduction

This chapter describes the following sections:

- Hardware and Software Requirements on page 11
- Switch Requirements on page 11
- EPM Installation on page 13

Hardware and Software Requirements

The EPM is a software application that is installed on a customer's PC. Table 4 displays the minimum requirements for a single user.

Table 4: Minimum Hardware and Software Requirements

Item	Windows	Linux
Processor	Pentium 4 or AMD Athlon	Pentium 4 or AMD Athlon
Operating System	Windows XP (Home or Professional)	Fedora Core 5 X-windows
Memory	512 MB (1 GB is recommended for better performance.)	512 MB (1 GB is recommended for better performance.)
Storage	10 GB	10 GB
CD-ROM Drive	Not required. The EPM is installed from a network download.	Not required. The EPM is installed from a network download.

Switch Requirements

The following apply to the switch used with the EPM.

- The EPM can be run on the following Extreme Networks switches:
  - BlackDiamond® 8800 series
  - Summit® family of switches (Summit X150, X250e, X450, X450a and X450e series)
  - BlackDiamond 10808
  - BlackDiamond 12800 series

NOTE

Although the BlackDiamond 8800 and Summit switches listed above support the EPM, they do not support CLEAR-Flow rules. Therefore, when the EPM is used with these switches, CLEAR-Flow rules and their raw rule text are displayed but the rules themselves are disabled

- The switch must be running ExtremeXOS™ 11.4 or later.
- The EPM requires a Secure Shell (SSH) module installed and running on the switch to manage policy file transfer. The default state of SSH is "disabled", so ensure that this application has been enabled using the `enable ssh2` command.

  To load and run the SSH module on a switch, use the following commands:

  a Download image `<ip> <yy>-xxx-ssh.xmod primary`

  where "`yy`" is the switch type and "`xxx`" is the release number

  For example, `download image 10.1.1.1 bd10k-11.4.4.7-ssh.xmod primary`

  b `run update`

  c `enable ssh2`

  d `enable clear-flow` (for CLEAR-Flow supported switches)

  For additional information, refer to the *ExtremeXOS Command Reference Guide* and the *ExtremeXOS Concepts Guide*.
- A Trivial File Transfer Protocol (TFTP) server must be installed and running prior to loading or saving policy files using the EPM. The server is required to transfer policy files to and from switches.

  Install an external TFTP server on port 69 and set the EPM's policy staging directory to the TFTP server's root. Set the staging directory after the EPM is installed. (Refer to "Configuring the EPM for use on a Switch" on page 18 for information on setting the staging directory and other configuration procedures.)
- Ensure that the EPM user has read/write permission to the installation directory and the TFTP directory.

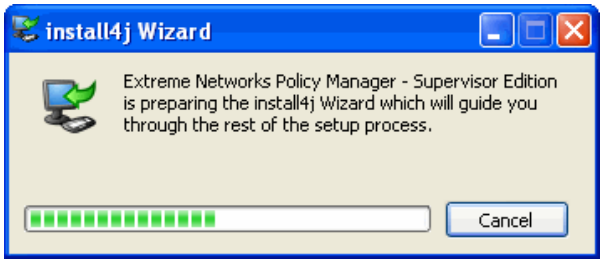
EPM Installation

The EPM is installed from a network download and utilizes a user interface installation Wizard. Use the following procedure:

1 Download the EPM program files from Extreme Networks' Software Downloads web page.

2 On Windows, double click the installation bundle executable icon.
On Linux, run the installation script (.sh file) from an xterm window.

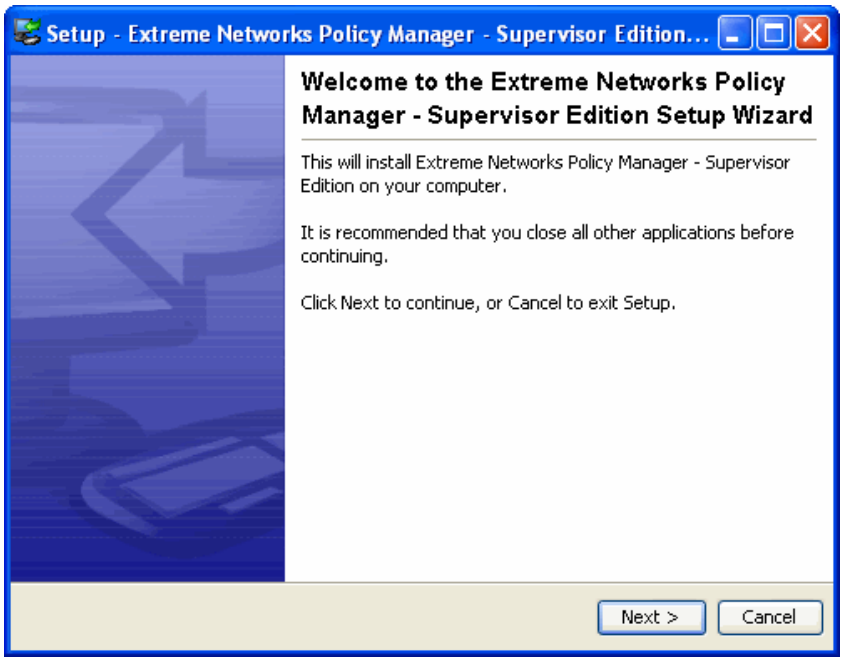
The Setup Wizard window is launched as shown below.


install4j Wizard
Extreme Networks Policy Manager - Supervisor Edition is preparing the install4j Wizard which will guide you through the rest of the setup process.
Cancel

NOTE

Installation on Linux uses the Installation Wizard with similar panels and properties.

and is followed by


Setup - Extreme Networks Policy Manager - Supervisor Edition...
Welcome to the Extreme Networks Policy Manager - Supervisor Edition Setup Wizard
This will install Extreme Networks Policy Manager - Supervisor Edition on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.
Next >
Cancel

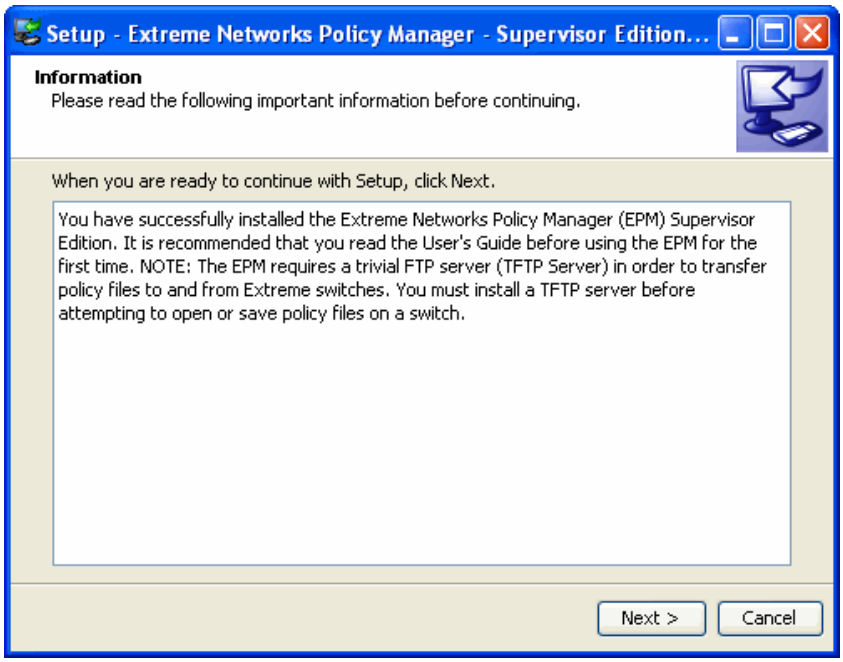
3 Continue progressing through the screens that ask you to:

- **a** Accept the license agreement,
- **b** Select the destination directory,
- **c** Select the start menu folder, and
- **d** Select additional tasks (Create a desktop icon, Create a Quick Launch icon).

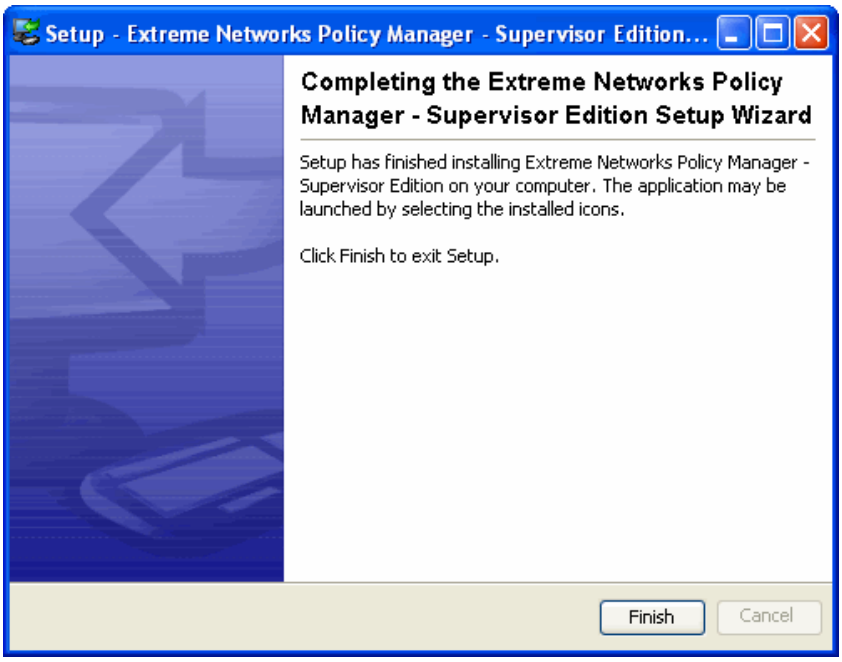
The Wizard then extracts and installs the files, and displays

e Notification of the file installation,

f The following Information window, and


Setup - Extreme Networks Policy Manager - Supervisor Edition...
Information
Please read the following important information before continuing.
When you are ready to continue with Setup, click Next.
You have successfully installed the Extreme Networks Policy Manager (EPM) Supervisor Edition. It is recommended that you read the User's Guide before using the EPM for the first time. NOTE: The EPM requires a trivial FTP server (TFTP Server) in order to transfer policy files to and from Extreme switches. You must install a TFTP server before attempting to open or save policy files on a switch.
Next >
Cancel

g The following finishing window.


Setup - Extreme Networks Policy Manager - Supervisor Edition...
Completing the Extreme Networks Policy Manager - Supervisor Edition Setup Wizard
Setup has finished installing Extreme Networks Policy Manager - Supervisor Edition on your computer. The application may be launched by selecting the installed icons.
Click Finish to exit Setup.
Finish
Cancel

4 Click **Finish**. The EPM is installed.

3 Viewing Policies and Rules

Introduction

This chapter provides a brief description of the different ways to view policies and rules in the Extreme Networks Policy Manager (EPM).

The EPM functions in two modes—local and switch. In local mode, the user can work independently within an offline set of files to create, modify and verify policies and rules. The local files can also be used as a backup system for files running on a switch. When working locally, certain elements of the application are hidden and can be seen only when connected to a switch. In switch mode, the user can utilize all the functions of the EPM.

Each policy is viewed and edited individually and only one policy can be open at a time. If one policy is open in the program and the user attempts to open or create another, the EPM prompts with a save command before closing the currently open policy.

This chapter describes the following sections:

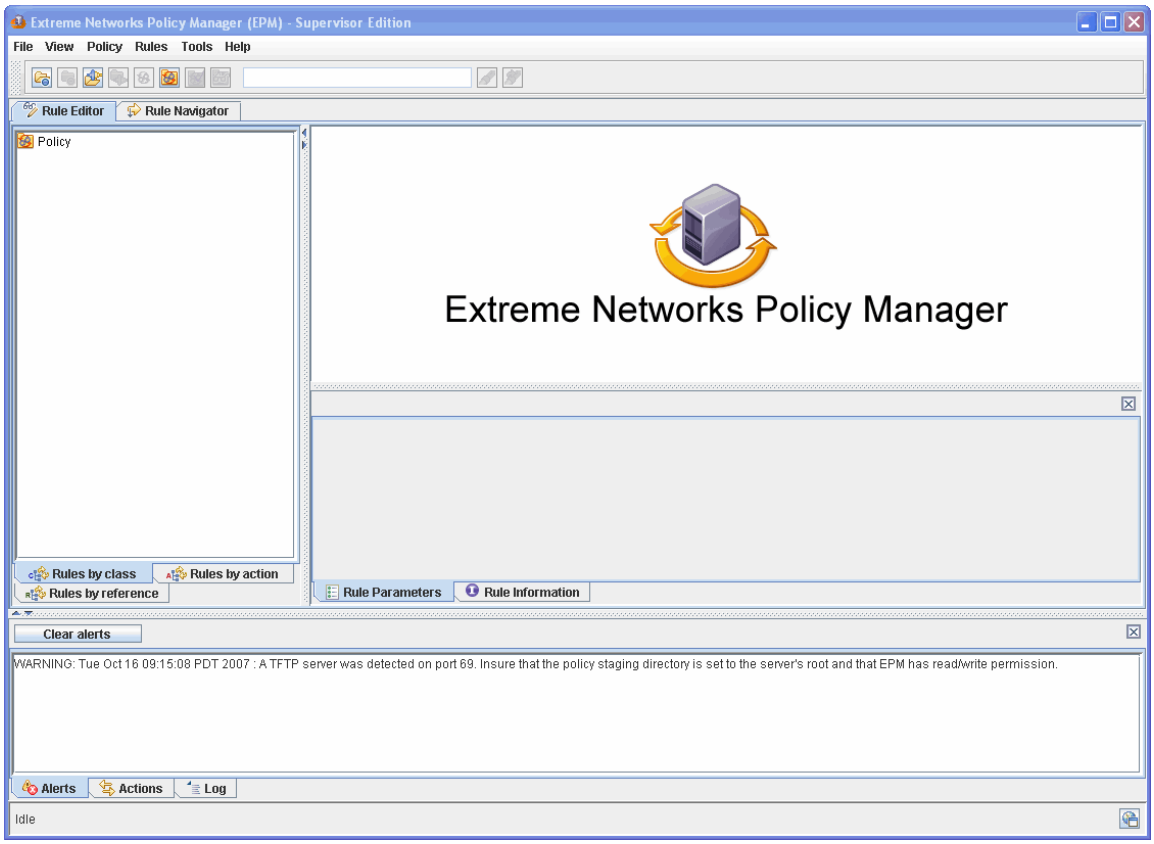
- Opening the EPM on page 15
- Configuring the EPM for use on a Switch on page 18
- Description of the Windows and Menus on page 20
- Opening an Existing Policy on page 30
- Searching for Rules in a Policy on page 33
- Working Among the Windows and Panels on page 36

Opening the EPM

1 Launch the EPM through **Start > Programs > Extreme Networks Policy Manager > epm_supervisor** or by using a desktop icon if one was selected during the installation process. The EPM opens to the Rule Editor window as shown below.

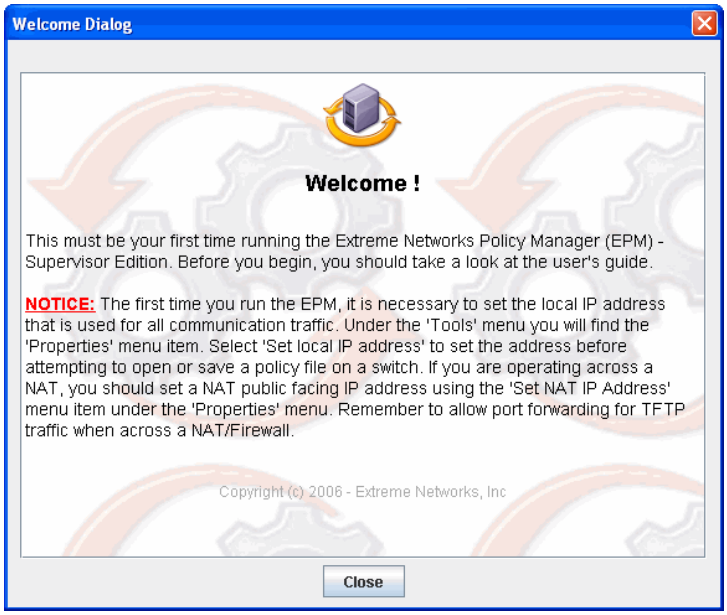
NOTE

Only one instance of the EPM can be executed on the desktop at a time.

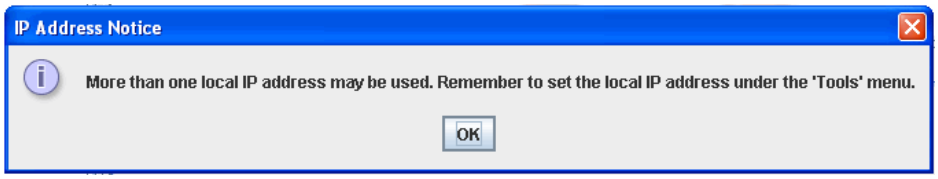

Extreme Networks Policy Manager (EPM) - Supervisor Edition
File View Policy Rules Tools Help
Rule Editor
Rule Navigator
Policy
Extreme Networks Policy Manager
Rules by class
Rules by action
Rules by reference
Rule Parameters
Rule Information
Clear alerts
WARNING: Tue Oct 16 09:15:08 PDT 2007 : A TFTP server was detected on port 69. Insure that the policy staging directory is set to the server's root and that EPM has read/write permission.
Alerts
Actions
Log
Idle

The first time the EPM program is launched, the following message is displayed

.

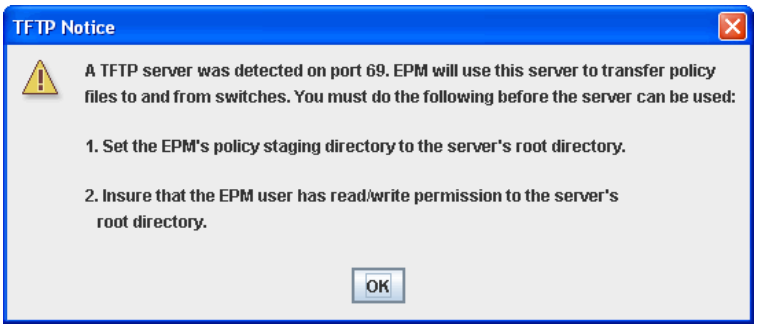

Welcome Dialog
Welcome !
This must be your first time running the Extreme Networks Policy Manager (EPM) - Supervisor Edition. Before you begin, you should take a look at the user's guide.
NOTICE: The first time you run the EPM, it is necessary to set the local IP address that is used for all communication traffic. Under the 'Tools' menu you will find the 'Properties' menu item. Select 'Set local IP address' to set the address before attempting to open or save a policy file on a switch. If you are operating across a NAT, you should set a NAT public facing IP address using the 'Set NAT IP Address' menu item under the 'Properties' menu. Remember to allow port forwarding for TFTP traffic when across a NAT/Firewall.
Copyright (c) 2006 - Extreme Networks, Inc
Close

2 After reading, **Close** the box. The following **IP Address Notice** is displayed. This notice is displayed every time the EPM is opened until an IP address has been set.



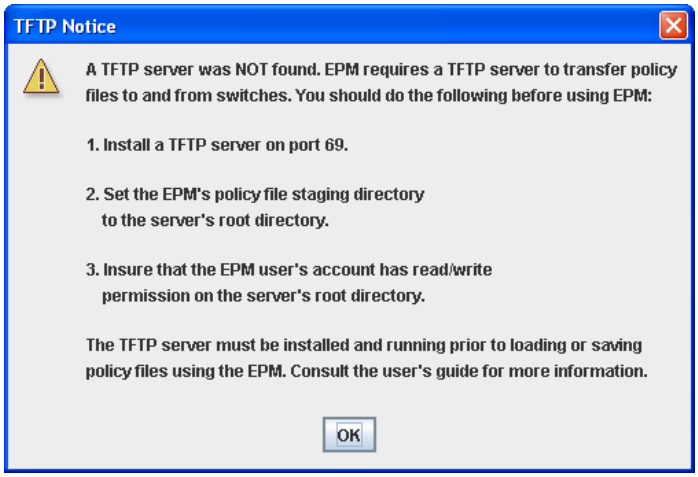
3 Click **OK**. The EPM then notifies the user if it has found a TFTP server. Without one, the EPM can open and save local policies only.

a If it finds a TFTP server, the following notice is displayed.


TFTP Notice
A TFTP server was detected on port 69. EPM will use this server to transfer policy files to and from switches. You must do the following before the server can be used:
1. Set the EPM's policy staging directory to the server's root directory.
2. Insure that the EPM user has read/write permission to the server's root directory.
OK

Refer to "Configuring the EPM for use on a Switch" on page 18 to set the policy staging directory.

b If it does not find a TFTP server, the following notice is displayed.


TFTP Notice
A TFTP server was NOT found. EPM requires a TFTP server to transfer policy files to and from switches. You should do the following before using EPM:
1. Install a TFTP server on port 69.
2. Set the EPM's policy file staging directory to the server's root directory.
3. Insure that the EPM user's account has read/write permission on the server's root directory.
The TFTP server must be installed and running prior to loading or saving policy files using the EPM. Consult the user's guide for more information.
OK

If necessary, take the appropriate action to enable a TFTP server.

4 Click **OK** to close the box. The EPM Rule Editor window remains.

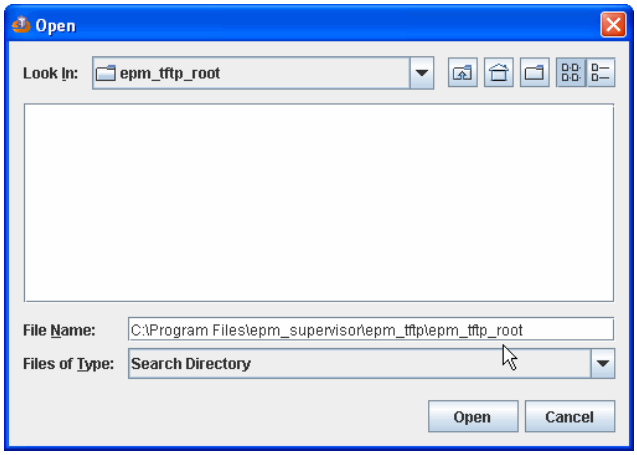
NOTE

A notice regarding TFTP server availability is also displayed in the Status Panel under the Alerts tab. (Refer to "Status Panel" on page 23.)

Configuring the EPM for use on a Switch

Before attempting to open a policy from a switch or save a policy to a switch, be certain that the following steps have been completed.

- The EPM has found a TFTP server. Check that the TFTP server is running on client and is listening on port 69.
- The user running the EPM has read/write/create permission to the TFTP server's root directory.
- The file staging directory is pointing towards the TFTP server's root directory. To set the directory:
  - **a** Choose **Tools > Properties > Set file staging directory** from the menu**.** A file **Open** box is displayed.
  - **b** Point to the TFTP server's root directory as shown below.



  - **c** Click **Open**. The box closes and the file staging directory is set.
- The local IP address is set. To set the address:
  - **a** Choose **Tools > Properties > Set Local IP Address** from the menu. A **Local IP Selection** box opens.
  - **b** From the dropdown menu, select an available IP address and click **OK**. The IP address is set.

NOTE

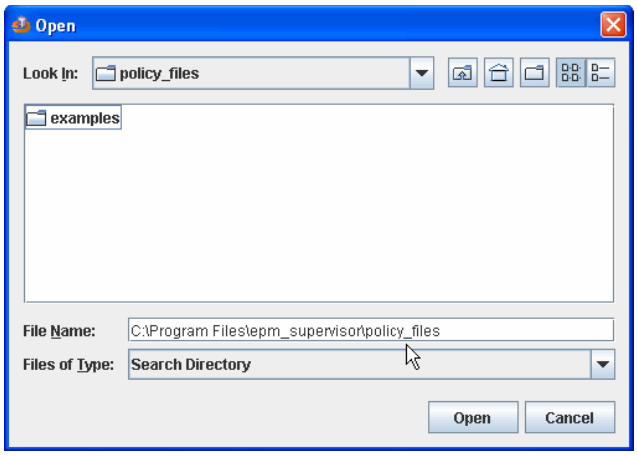
If the network configuration is changed, the local IP address must be reset.

- If applicable, set the public side address of NAT. If not applicable, leave blank. To set the address:
  - **a** Choose **Tools > Properties > Set NAT IP address** from the menu. An **Input** dialog box is displayed.
  - **b** Enter the address and click **OK**.

NOTE

Network Address Translation (NAT) is a method used by networking equipment such as routers to share an IP address.

- The file search directory is pointing towards the policy files as shown below. This is the default. Choose **Tools > Properties > Set file search directory** to check the file name in the file **Open** box.

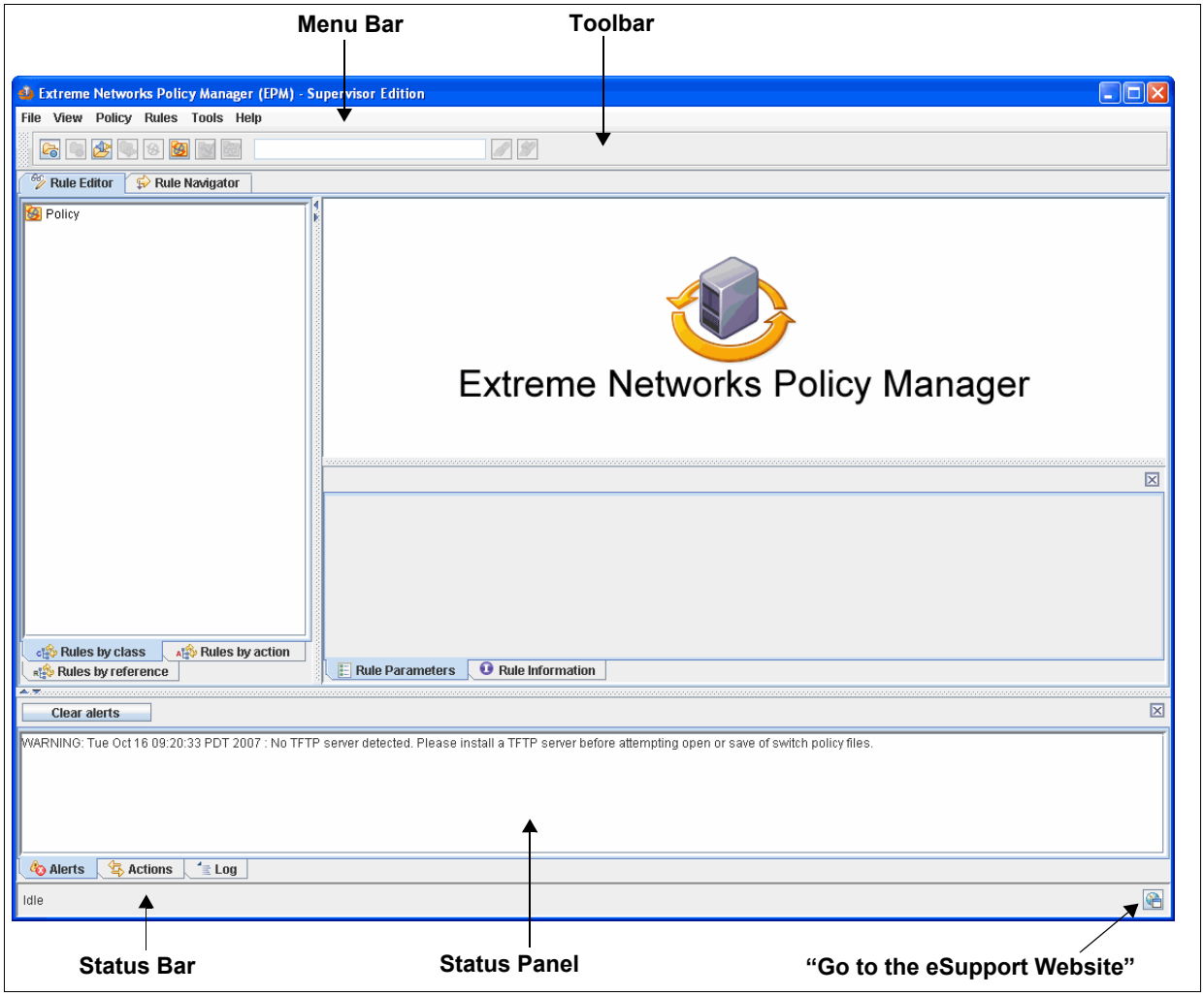


Description of the Windows and Menus

The EPM Desktop

The program opens to the Rule Editor window. The two primary working windows are the Rule Editor window which is described on page 26 and the Rule Navigator window which is described on page 29.

Some window elements are common to both the Rule Editor and the Rule Navigator windows. The following screen identifies those common elements.



These include:

- A standard **Menu Bar,** discussed **on page 21**
- A **Toolbar**, discussed **on page 23**
- A **Status Panel,** discussed **on page 23**
- A **Status Bar,** discussed **on page 25**
- A link icon to access the eSupport Website

Menu Bar

The **Menu Bar** consists of six standard menus—**File**, **View**, **Policy**, **Rules**, **Tools** and **Help**. Table 5 describes the elements of these menus.

Table 5: EPM Standard Menus

Menu Components	Description
File	
New	Begins the process to create a new policy. Refer to "Creating a New Policy" on page 37.
Open	Opens an existing policy file.
Switch	Opens an existing policy file from a switch. Refer to "Opening a Policy File from a Switch" on page 31.
Local	Opens an existing policy file from a local file. Refer to "Opening a Policy File Locally" on page 30.
Save	Saves changes to an existing policy in the location (switch or local) in which it was opened.
Save As	Saves a new policy or saves changes to an existing policy to a different location. Refer to "Creating a New Policy" on page 37.
Switch	Saves to a switch.
Local	Saves locally.
Import From	Imports all rules from one policy into the current policy. Refer to "Importing Rules" on page 41.
Export To	Exports all rules from the current policy to populate a new policy or to replace the existing rules in another policy. Refer to "Exporting Rules" on page 42.
Exit	Closes the EPM.
View	Shows and hides certain panels in the window. When one or more is hidden, the shown panels expand to fill the window.
Status Panel	Shows and hides the Status Panel.
Rule Properties Panel	Shows and hides the Rule Properties Panel.
Tool Bar	Shows and hides the Tool Bar.
Policy	Includes functions to create, modify and check a policy.
New Policy	Begins the process to create a new policy. Refer to "Creating a New Policy" on page 37.
Search	Searches the current policy for specific rules. Refer to "Searching for Rules in a Policy" on page 33.
Validate & Check	Validates and checks a new or modified policy. Refer to "Validating and Checking a Policy" on page 40.
Refresh	Refreshes the currently loaded policy when it is activated on a switch after it has been modified. Refer to "Applying Changes to an Activated Policy" on page 47.
Activity	Activates a policy stored on the switch, allowing control of the active VLANs and active ports of the current policy. Refer to "Managing Policy Activity" on page 50.
Recalculate rule ranks	Recalculates the rule ranks when ACL and/or CLEAR-Flow rules have been added to or deleted from the policy. Refer to "Organizing Rules" on page 49.
Reorder rules by rank	Places rules in order by rule rank when they have been recalculated. Refer to "Organizing Rules" on page 49.

Table 5: EPM Standard Menus (Continued)

Menu Components	Description
Reorder rules by initial position	Places rules in their original position regardless of rank. Refer to "Organizing Rules" on page 49.
Rules	Begins the process to create a new rule.
New Rule	Opens the Rule Wizard to create a new rule. Refer to "Creating a New Rule for a Policy" on page 37.
Tools	
Global Variables...	Opens a dialog box in which global variables can be set. Refer to "Managing Global and Policy Variables" on page 48.
Policy Variables...	Opens a dialog box in which policy variables can be set. Refer to "Managing Global and Policy Variables" on page 48.
Synonyms...	Displays a list of synonyms. Refer to "Synonyms used for Rule Constants" on page 65.
System Counters...	Displays a list of predefined CLEAR-Flow system counters. Refer to "Predefined CLEAR-Flow System Counters" on page 63.
Properties	Refer to "Configuring the EPM for use on a Switch" on page 18 for the following properties.
Set local IP address	Opens a box to choose from available IP addresses or enter a new address.
Set NAT IP address	Opens a box to set the public side address of your NAT (Network Address Translation), if appropriate.
Set files search directory	Sets the default directory for finding policy files when a policy is opened locally. The **Open > File** function will set itself to this location.
Set file staging directory	Sets the location of the tftp server's root directory. Files are 'staged' or copied to and from the root directory when a policy is opened and saved on a remote switch. Refer to "Configuring the EPM for use on a Switch" on page 18.
Message Capture	Captures data to be used to diagnose problems.
Tracing	Turns tracing log on and off.
Debug	Turns debug log on and off. When on, a message is written to a debug text file and is not displayed in an EPM window.
Set Capture Size	Sets the maximum number of lines of data to be captured. The allowed range is between 1 and 100,000.
Policy Parsing	
Ignore Unknown Keywords	Turns Ignore Unknown Keywords on and off. When on (the default), a policy with terms that the EPM does not understand, is loaded but with qualifications. When off, a policy that the EPM does not understand is not loaded. Refer to "Policy Parsing" on page 32.
Sentriant Actions	
Reset XML to factory	When the Sentriant XML code has been rewritten, replaces it with the original factory code.
Write XML	Allows you to write specialized code to replace or supplement factory code.
Help	
About Extreme Networks Policy Manager	Lists: Application Name, Edition, Version and Build number.

In the Rule Editing and Viewing Panel and the Rule Navigator window, another menu is displayed when you right-click any rule in the list. For details about the functions of this menu, refer to the chapter, "Modifying Policies and Rules" on page 43.

Toolbar

The **Toolbar** contains icons for the most common menu operations and are shown in Table 6.

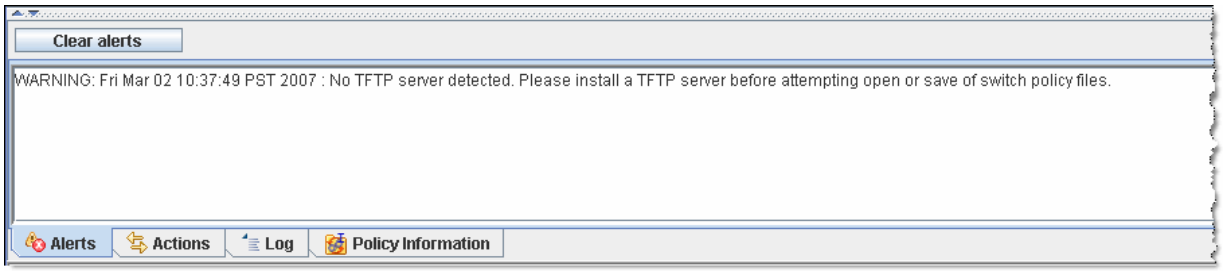
Table 6: Toolbar Icons

Icon	Description
	Opens a local policy
	Saves changes to a local policy
	Opens a policy from a switch
	Saves changes to a policy on switch
	Creates a new rule
	Creates a new policy
	Validates and checks a policy
	Searches a policy for particular rule elements
	Searches for a particular rule
	Repeats the search for a particular rule

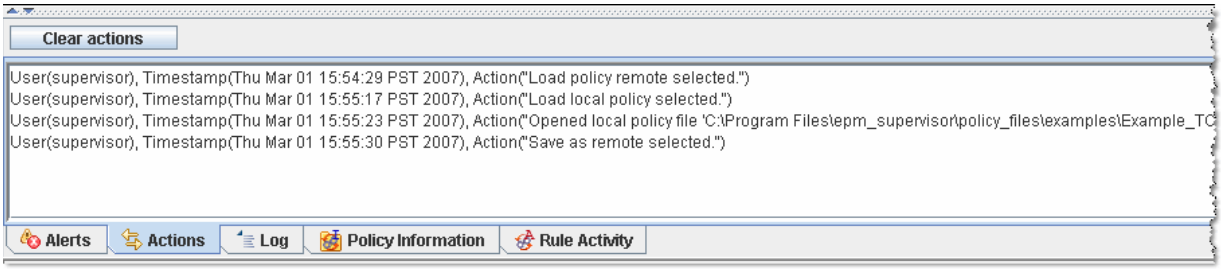
Status Panel

The **Status Panel** displays data from different log files—**Alert**, **Actions**, **Log**, **Policy Information** and **Rule Activity**. A log is selected by clicking its panel tab. These logs are described below with examples of the screens.

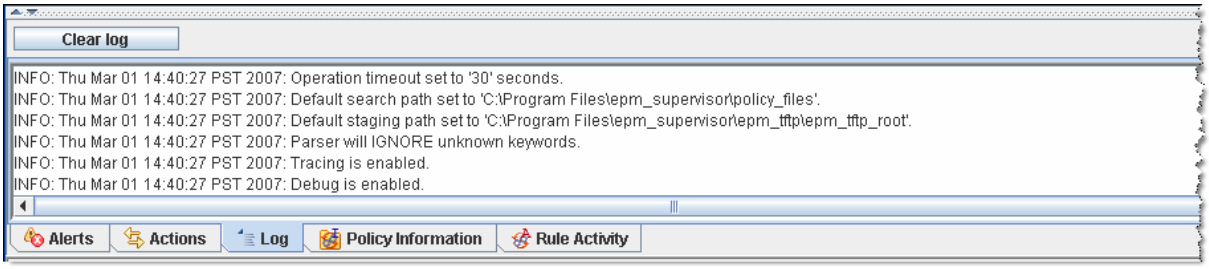
- The **Alerts** tab Alerts displays the alerts log messages. Alerts are warnings or notices about an action or error that may or may not have inhibited EPM functions.


Clear alerts
WARNING: Fri Mar 02 10:37:49 PST 2007 : No TFTP server detected. Please install a TFTP server before attempting open or save of switch policy files.
Alerts
Actions
Log
Policy Information

- The **Actions** tab displays the actions log messages. All user actions are recorded for audit purposes. (The replay of actions is planned for a future release.)

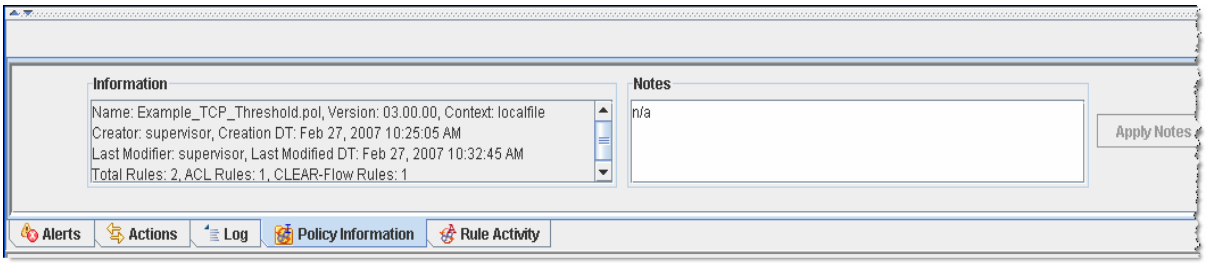

Clear actions
User(supervisor), Timestamp(Thu Mar 01 15:54:29 PST 2007), Action("Load policy remote selected.")
User(supervisor), Timestamp(Thu Mar 01 15:55:17 PST 2007), Action("Load local policy selected.")
User(supervisor), Timestamp(Thu Mar 01 15:55:23 PST 2007), Action("Opened local policy file 'C:\Program Files\epm_supervisor\policy_files\examples\Example_TC
User(supervisor), Timestamp(Thu Mar 01 15:55:30 PST 2007), Action("Save as remote selected.")
Alerts
Actions
Log
Policy Information
Rule Activity

- The **Log** tab displays common log messages. The common log contains any trace or error messages that inhibit or cause failure of EPM functions.


Clear log
INFO: Thu Mar 01 14:40:27 PST 2007: Operation timeout set to '30' seconds.
INFO: Thu Mar 01 14:40:27 PST 2007: Default search path set to 'C:\Program Files\epm_supervisor\policy_files'.
INFO: Thu Mar 01 14:40:27 PST 2007: Default staging path set to 'C:\Program Files\epm_supervisor\epm_tftp\epm_tftp_root'.
INFO: Thu Mar 01 14:40:27 PST 2007: Parser will IGNORE unknown keywords.
INFO: Thu Mar 01 14:40:27 PST 2007: Tracing is enabled.
INFO: Thu Mar 01 14:40:27 PST 2007: Debug is enabled.
Alerts
Actions
Log
Policy Information
Rule Activity

For each of these three logs (Alerts, Actions and Log), there is a "Clear" button that removes the entries currently appearing on the screen. These entries are then stored in the program's log files (\Program Files\epm_supervisor\log). To set the maximum number of status capture lines for a log, choose **Tools > Properties > Message Capture > Set Capture Size** from the menu.

- The **Policy Information** tab is displayed when a policy is opened and shows **Information** and **Notes** about that currently open policy. **Information** shows basic data including when and by whom the policy was created and last modified as well as the number and type of rules. **Notes** might include the purpose of the policy or other user defined identifiers. This is a read/write text box.



To add to the **Notes** field:

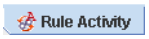
a In the field, begin typing the desired text. The **Apply Notes** button is enabled.

b When the text is entered, click the **Apply Notes** button. The text is added.

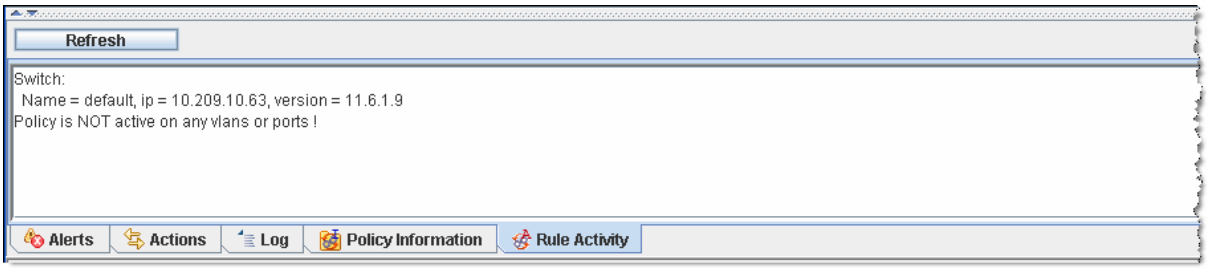
To remove notes:

a Highlight the text to be removed then press the keyboard's **Delete** or **Backspace** key. The **Apply Notes** button is enabled.

b Click the **Apply Notes** button. The text is removed.

- The **Rule Activity** tab 

displays activity data for a policy running on a switch. The EPM updates the data every 15 to 30 seconds. This log is shown only when the EPM is connected to a switch.



For the Rule Activity log, there is a Refresh button that manually updates any modified activity.

Status Bar

The Status Bar displays the current activity of the EPM. When it is not executing a function it reads "Idle." Otherwise, it shows an explanation of the function that is running. For example:

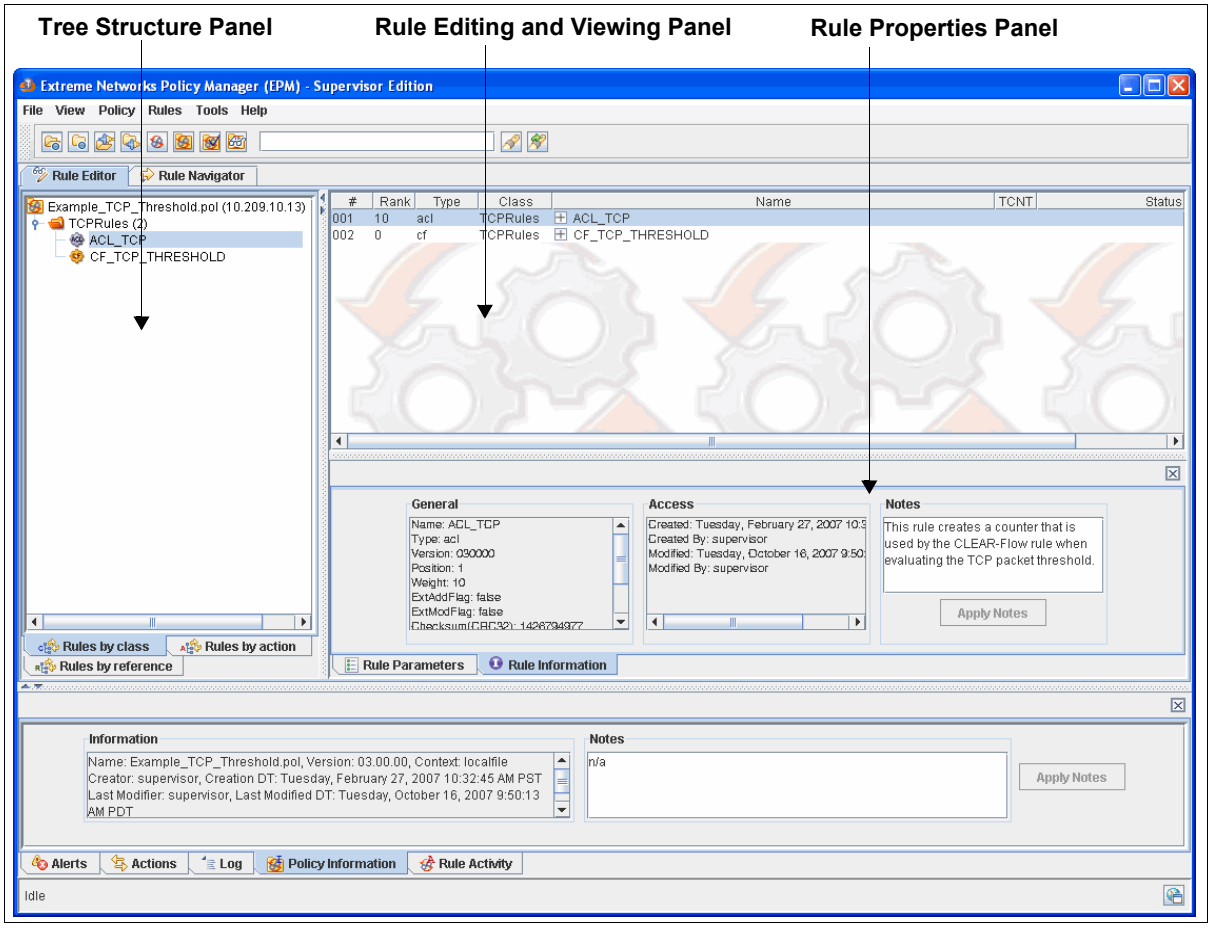
- When opening a file locally, the status bar reads "Operation 'OpenLocal' is in progress. (The operation should complete within '30' seconds.)" or
- When exiting the EPM, the status bar reads "Operation 'FlushLogsAndExit' is in progress (The operation should complete within '30' seconds.)"

Rule Editor Window

When a policy is opened from either the local files or from a switch or when a new policy is created, the Rule Editor Window is displayed.

The following screen shows the Rule Editor Window and the elements unique to this window. They include:

- Tree Structure Panel, discussed on page 26
- Rule Editing and Viewing Panel, discussed on page 27
- Rule Properties Panel, discussed on page 28



Hide and Show the Panels

The different window panels can be hidden or shown by:

- Clicking the up, down and side “arrow points” adjacent to the Tree Structure, and Status panels
- Clicking the **X** in the upper right corner of the Rule Properties and Status panels
- From the Menu Bar, selecting and deselecting the boxes from the **View** > **Status Panel, Rule Properties Panel,** and **Tool Bar** submenus

When a panel is hidden using these methods, the remaining panels expand to fill the window.

Tree Structure Panel

The Tree Structure Panel displays the ACL and CLEAR-Flow (or CF) rules that are included within the selected policy. ACL rules are identified with a silver icon and CLEAR-Flow rules with a gold icon .

Within this panel, the rules can be organized and displayed in three different ways. Use the three tabs that are located below the panel to organize and display the rules according to the following:

Rules by class	Displays the rules by their class.(Refer to “Class” in the next table.)
Rules by action	Displays the rules by each action included in the rule. • For ACL rules, the actions are: Permit, Deny, Count, CVID, Link Aggregation Hash, Qos, SCOS, STAG Ethertype, SVID, Traffic Queue, and Uplink Port. • For CF rules the actions are: Permit, Deny, Qos, Mirror, Cli, Snmp, and Syslog.
Rules by reference	Displays the rules showing the connection between an specific ACL rule and a CLEAR-Flow rule. An ACL rule that is shown in blue text is one that does not have a corresponding CLEAR-Flow reference or vice versa.

Information in this panel is displayed using a standard tree structure that allows subcomponents to be hidden or shown by clicking the "key" icon.

NOTE

Right-click actions are not supported in the tree structure panel.

Rule Editing and Viewing Panel

The Rule Editing and Viewing Panel displays the following information for each rule:

#	A number that shows the position of each rule in the policy. If the rules are reordered, the position numbers for the rules change accordingly.
Rank	The rank number is used to indicate the order in which the rules are stored in the policy file. They are stored in descending order. The user can set the order by positioning the rules manually or rely on the EPM’s algorithm to establish an efficient order based on the specificity of the rule. The algorithm is available when creating a rule or later by using the menu command **Policy > Recalculate rule ranks**. The menu command is used when creating new rules and for recalculating rank when rules have been added or deleted from the policy.
Type	The type of rule—ACL or CLEAR-Flow.
Class	The class is a friendly name label that the user defines to customizes the rules according to individual needs and categories. When a class is not named, the default is “Generic.”
Name	Name of the rule. Clicking on the plus sign expands each rule to display its raw rule text.
TCNT	Trigger Count. TCNT is shown when the policy opened on a switch is activated by the Activity Manager. It represents the number of times the ACL or CLEAR-Flow rule has been evaluated and triggered or fired. The TCNT is updated only when a policy is opened on a switch and when the **Refresh** button above the **Rule Activity** tab display on the Status Panel is pressed. For policies opened locally, nothing is displayed under the TCNT column.
Status	Status displays whether a policy that was saved with the EPM has been modified without the EPM. When the policy has not been so modified, there is no entry in the column. When the policy has been so modified the status column entry is “Rule modified externally.”

Another feature of this panel is a dropdown menu that is displayed when you right-click any rule in the list. The menu displays functions that are used primarily to edit and modify policies and rules. For details about this menu, refer to the chapter, "Modifying Policies and Rules" on page 43.

Rule Properties Panel

The Rule Properties Panel is made up of three boxes under two tabs. The three boxes display different elements of the selected rule.

Rule Parameters Tab. Clicking the **Rule Parameters** tab displays the following information:

- When an ACL is selected from either the Tree Structure or the Rule Editing and Viewing Panel, the rule parameters displayed are:

Match Conditions	The match conditions contained in the rule—the "if" statement. A list of available match conditions is included in Appendix A on page 69.
Actions	The action taken when the packet matches the match conditions—the "then" "permit or deny" statement. If the packet matches all the match conditions and if there is no action specified in the "then" statement, "permit" is used by default.
Action Modifiers	Additional modifiers to the actions, such as "count", cvid, link-aggregation-hash, traffic queue, or redirect.

- When a CF is selected, the rule parameters displayed are:

Match Conditions	The conditions that will trigger the rule and how often to evaluate the rule.
Actions (True Condition)	The list of actions to take when the rule is triggered—the "then" clause.
Actions (False Condition)	The list of actions to take after the rule is triggered and when the match conditions later become false—the else clause.

Icons are connected to each of the three boxes and are used to edit the parameters. They are:

Delete Selection

Edit Arguments of selected

Add

Rule Information Tab. Clicking the **Rule Information** tab displays the following information:

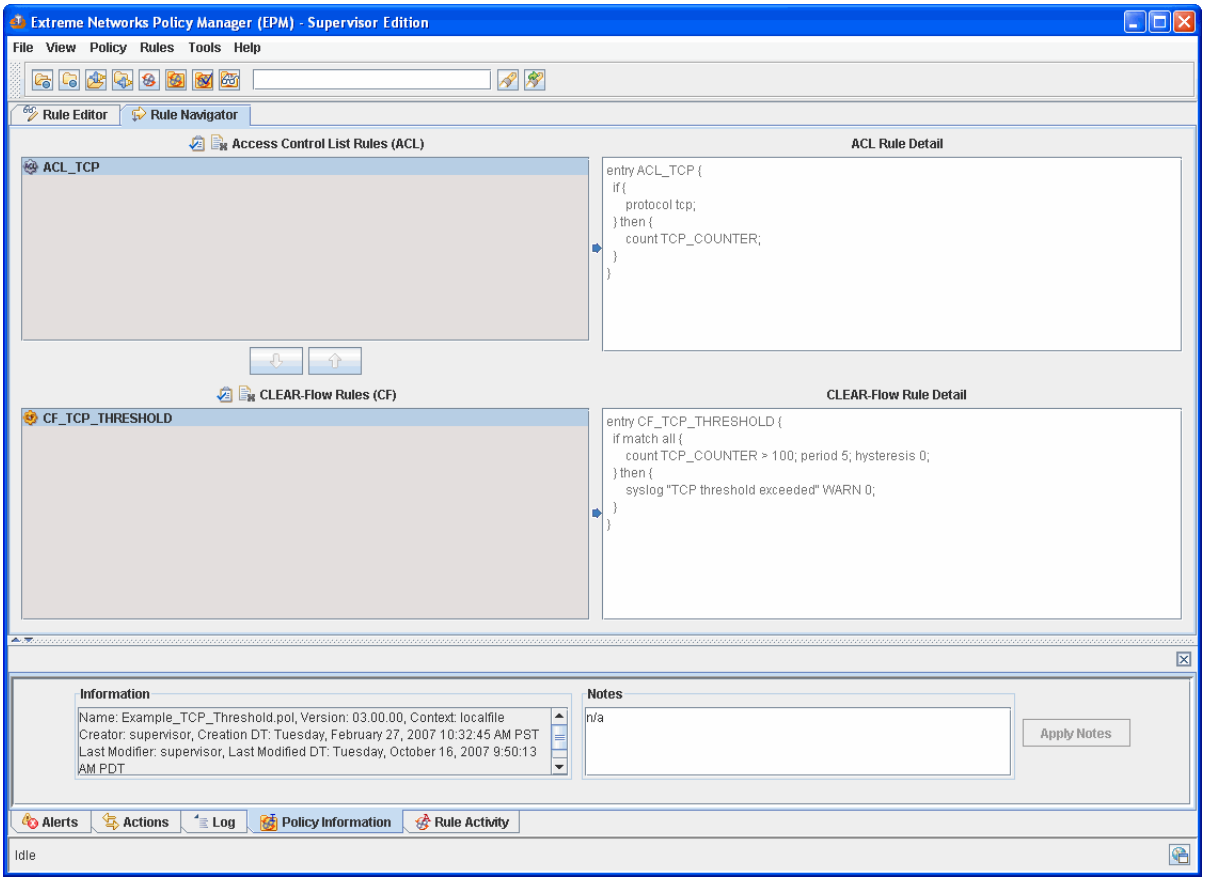
General	A summary of the basic information about the rule including: Name; Type; Policy Version; Action information, and so forth.
Access	Details showing when and by whom the rule was created and, if applicable, modified. In the Supervisor edition, the "by whom" is always the supervisor.
Notes	A read/write text box into which notes such as the purpose of the rule can be added. To add notes, click inside the text box and begin typing. The **Apply Notes** button is enabled. Click the button when the entry in complete. To delete notes, highlight the text to be removed then strike the keyboard's **Delete** or **Backspace** key. The **Apply Notes** button is enabled. Click the button.

Rule Navigator Window

From the Rule Editor window, clicking the **Rule Navigator** tab displays the Rule Navigator window.

The screen below shows the Rule Navigator Window and the elements unique to this window. Those elements include:

- **Access Control List Rules (ACL)** and **ACL Rule Detail**
- **CLEAR-Flow Rules (CF)** and **CF Rule Detail**



The **Access Control List (ACL) Rules** panel displays the names of the ACL rules that are included in the policy that is open. **ACL Rule Detail** displays the raw rule text for the ACL rule that is selected.

The **CLEAR-Flow (CF) Rules** panel displays the names of the CF rules that are included in the policy that is open. **CF Rule Detail** displays the raw rule text for the CF rule that is selected.

Above both the Access Control List Rules panel and the CLEAR-Flow Rules panel are the following two icons.

Marks the selected rule

Clears all marks

Between the Access Control List rules panel and the CLEAR-Flow Rules panel are two icon arrows which toggle filters on and off.

A toggle button that when clicked filters the CLEAR-Flow rules to show only those that are referenced by the selected ACL rule. In the CF Rule Detail panel, the reference is highlighted in yellow. Click the button a second time to toggle the filter off and again show all CLEAR-Flow rules.

A toggle button that when clicked filters the ACL rules to show only those that are referenced by the selected CLEAR-Flow rule. In the ACL Rule Detail panel, the reference is highlighted in yellow. Click the button a second time to toggle the filter off and again show ACL rules.

Opening an Existing Policy

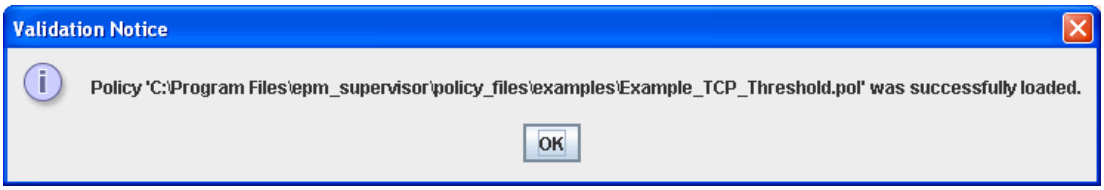
An existing policy file can be opened from either a local file or a switch.

Opening a Policy File Locally

1 Choose **File > Open > Local**. The **Open** dialog box appears.

2 Navigate to a policy and click **Open**.

When the process is successful, an **Operation Progress** box is displayed as the policy is opened, followed by the following **Validation Notice** screen, that shows the path to the policy.



When the EPM cannot find the required metadata to determine the policy file version, a **Policy Version Notice** box is displayed that requests more information.

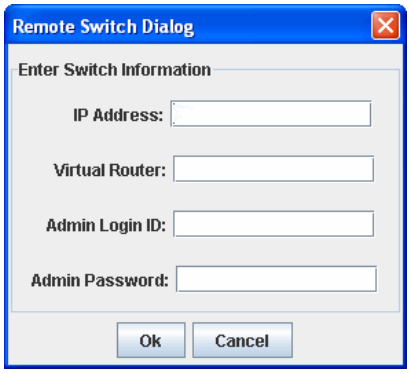
a Click **OK**. A **Policy Version Selection** box is displayed.

b From the **Versions**: panel, select an appropriate version based on information in the **Description** panel and click **OK**. The **Operation Progress** box is displayed followed by a **Validation Notice**.

Opening a Policy File from a Switch

1 Ensure that your TFTP server is open.

2 From the EPM menu, choose **File > Open > Switch**. An **Operation Progress** box is displayed followed by a **Remote Switch Dialog** box as shown below.



3 Enter the following information, completing all four fields. Leaving a field blank does not result in default behavior.

a The **IP Address** of the switch to which you want to connect

b The **Virtual Router** on which the SSH server traffic is routed

c The **Admin Login ID**

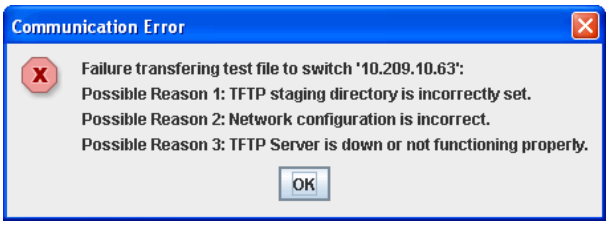
d The associated **Admin Password**

Then click **OK**. An **Operation Progress** box is displayed showing that the connection to and from the switch is being checked.

NOTE

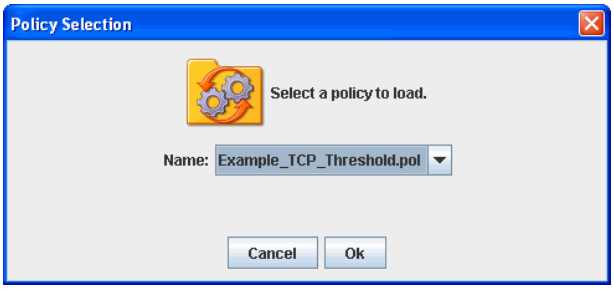
The EPM remembers the Remote Switch Dialog settings after they have been entered and the connection is successful.

4 When there is a problem with the connection, the following box is displayed.


Communication Error
Failure transfering test file to switch '10.209.10.63':
Possible Reason 1: TFTP staging directory is incorrectly set.
Possible Reason 2: Network configuration is incorrect.
Possible Reason 3: TFTP Server is down or not functioning properly.
OK

Check the suggested reasons and make the necessary adjustments. For additional information, refer to "Configuring the EPM for use on a Switch" on page 18.

When there is no problem with the connection, a **Policy Selection** box opens as shown below.



5 From the dropdown menu, choose the desired policy name and click **OK**. The **Operation Progress** box is displayed and is followed by a **Load Notice** box stating that the policy was successfully loaded.

6 Click **OK**. In the Tree Structure Panel, the IP address of the switch is displayed following the policy name.

NOTE

The Operation Progress box appears when policies are being loaded from or saved to a switch, indicating that the switch connection is being checked.

Some EPM functions are active only when the program is connected to a switch and are either not displayed or not enabled in the local mode. These include the following:

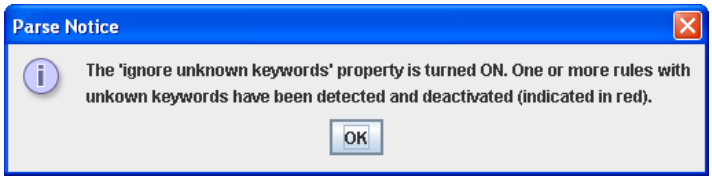
- The Status Panel's Rule Activity tab is displayed only when connected to a switch.
- The Rule Editing and Viewing Panel's TCNT entries do not show unless connected to a switch.

Policy Parsing

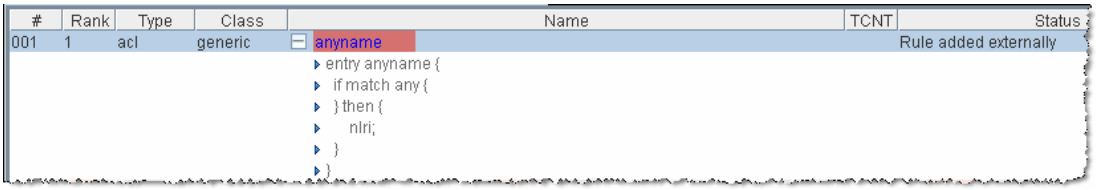
The EPM can be set to respond in one of two ways when an attempt is made to open an invalid policy.

1 From the menu, choose **Tools > Properties > Policy Parsing > Ignore Unknown Keywords**. The box is checked by default.

When the box is checked, the EPM attempts to load the policy. When such a policy is encountered, a **Parse Notice** box is displayed as shown below.


Parse Notice
The 'ignore unknown keywords' property is turned ON. One or more rules with unkown keywords have been detected and deactivated (indicated in red).
OK

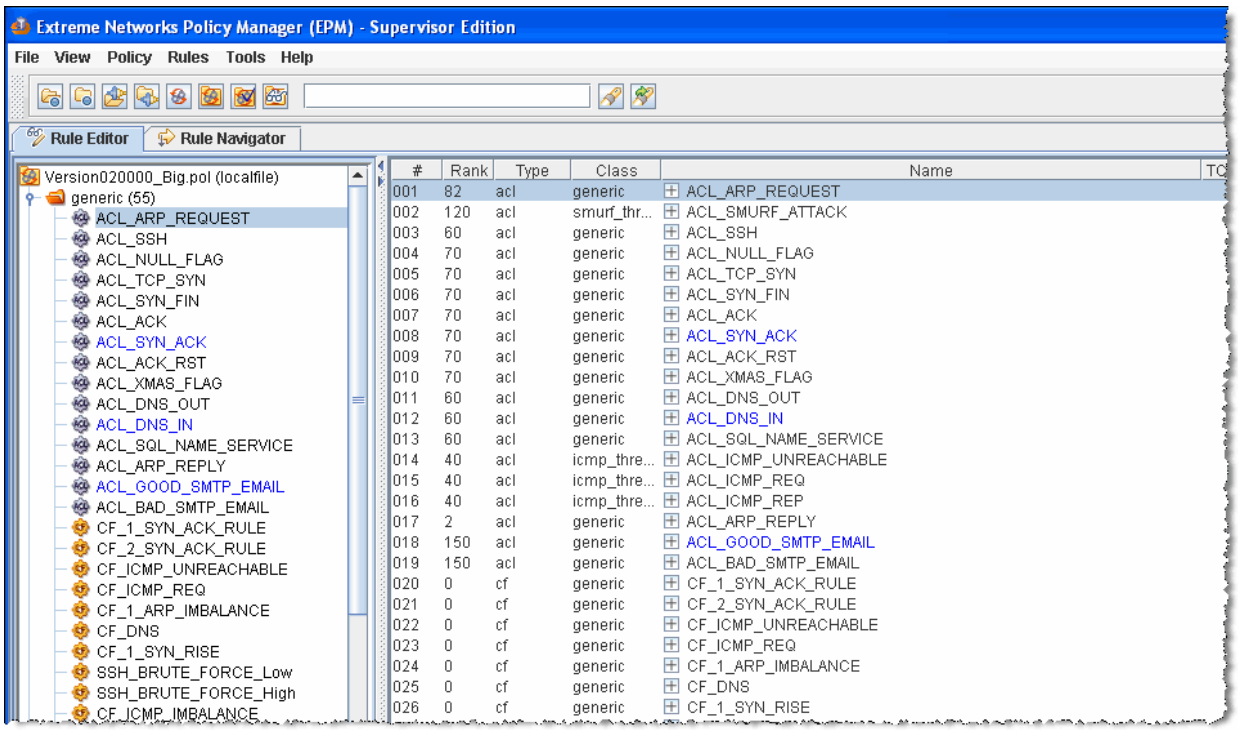
2 Click **OK** and the rule display in the rule viewing panels resembles the following:



When the box is unchecked, the EPM responds with an invalid message and does not attempt to load the policy.

Searching for Rules in a Policy

The EPM includes the functionality to search a policy to find: 1) particular rules by name or 2) all rules that have certain parameters as selected by the user. These can be demonstrated using the rules shown in the following policy.



Search by Name

To search for a rule in the Rule Editing and Viewing Panel by name or partial name, use the following procedure:

1. In the text box located in the Toolbar, type all or part of the desired rule name, for instance: "**ACK.**"
2. Click the **Find Rule** icon . The first rule in the Rule Editing and Viewing Panel that matches the entered criteria, is then highlighted. In this example, the rule is "ACL_SMURF_ATT**ACK**."
3. Click the **Find Next** icon to continue the search. In the example, the next rule is ACL-**ACK**.
4. Continue as needed until the **Find Notice** box reading "Search reached end of policy" is displayed.

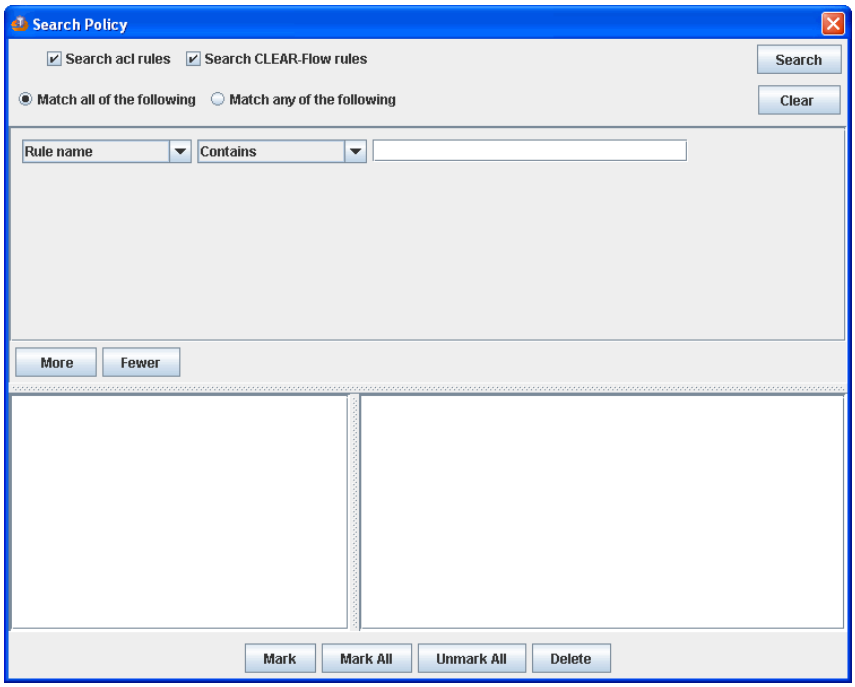
NOTE

When a rule is found and highlighted in the Rule Editing and Viewing Panel, it is also highlighted in the other rule listings in both the Rule Editor window and the Rule Navigator window.

Search by Parameter

To search for one or more rules that have specified elements, use the following procedure:

1 From the menu choose **Policy > Search** or click the **Search Policy** icon . A **Search Policy** dialog box opens as shown below.



2 Click the boxes to indicate **Search acl rules** and/or **Search CLEAR-Flow** rules.

3 Click either the **Match all of the following** or the **Match any of the following** radio button.

4 Click the **More** command button. A row of three fields is displayed as shown:

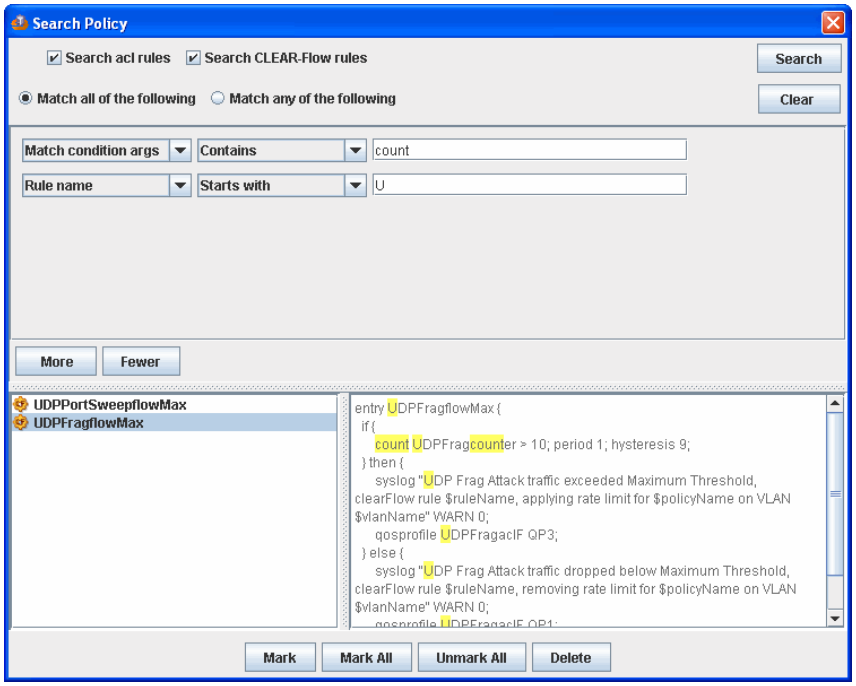
5 From the first (Rule Name) and second (Contains) dropdown menus, select the features on which to search and in the text field, type specific values. For example: In the first box select "Match condition args" and in the second box "Contains". In the text field, type "count." Then click the **Search** button. The rules matching the search criteria are displayed in the bottom left box.

6 Click on any of the listed rules to see the raw rule text and the requested value highlighted in the bottom right box.

7 To further refine the search, click the **More** button again to add another criteria row then specify the search criteria. In this example, select "Rule Name" and "Starts with" and in the text field, type "U" and click **Search**. The list of rules is reduced as seen below. Note that in the script, both "count" and "U" are highlighted.

NOTE

The search function is not case-sensitive, but the highlighting function is.



8 Continue modifying the search by adding **More** or **Fewer** criteria.

9 To remove any specific rules from the policy, select the rule and click the Delete command button.

CAUTION

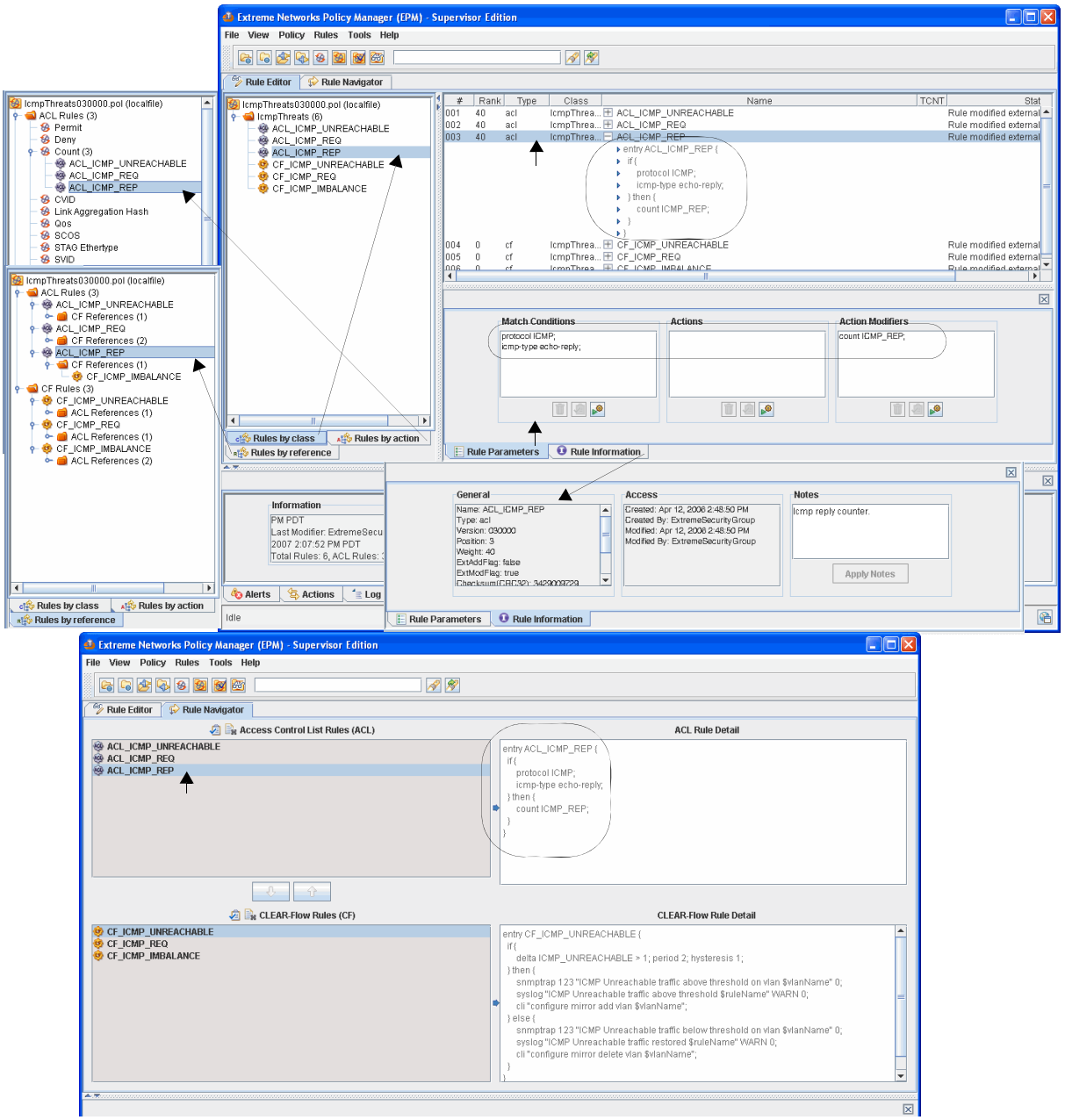
The Delete command button removes a rule from the policy completely, not only in this action.

10 If desired, mark any rules using the "Mark" buttons. When the **Search Policy** window is closed, these marks are displayed in the main windows.

11 To remove the search results, click the **Clear** command button.

Working Among the Windows and Panels

When a particular policy or rule is selected in any of the windows or panels, it is automatically selected in all of the windows and panels. For example, in the screens below, the rule ACL_ICMP_REP was selected by the user from the **Tree Structure Panel**. The same selection appears automatically in all other rule viewing panels. This allows the user to make one selection and move throughout the program without having to make a matching selection. In the figure below, arrows point to the common rule selection and the raw rule text for the rule is circled.



4 Creating Policies and Rules

Introduction

The Extreme Networks Policy Manager (EPM) is used by first creating a policy and then populating it with ACL and CLEAR-Flow rules.

Policies and Rules can be created locally, tested and verified, and then pushed to a switch.

This chapter describes the following sections:

- Creating a New Policy on page 37
- Creating a New Rule for a Policy on page 37
- Saving a Policy on page 39
- Validating and Checking a Policy on page 40
- Importing and Exporting Rules into a Policy on page 41

Creating a New Policy

To create a new policy, use the following procedure.

1 From the Menu, choose **Policy > New Policy** or **File > New** or click the icon. The **Policy Version Selection** box opens.

2 From the **Versions**: panel, select either **02.00.00** or **03.00.00** and click **OK**. A new_policy.pol (localfile) is displayed in the **Tree Structure** panel.

NOTE

The version 3 policy supports access control list (ACL) and CLEAR-Flow (CF) rules.
The version 2 policy supports access control list (ACL) rules only

3 Add one or more rules to the policy as described in the following sections.

NOTE

Rules must be added to a new policy before the policy can be saved.

Creating a New Rule for a Policy

To create a new rule, use the following procedure.

1 From the Menu, choose **Rules > New Rule** or click the icon. The **Rule Wizard** opens.

2 In the **Rule Wizard** box, make the following entries:

a In the **Rule Name** text box, type a name.

b From the **Class Name** dropdown menu, choose an existing class or type a new class name.

NOTE

If the new rule is being added to an existing policy, the dropdown menu contains selections of those class names that are currently in the policy. If it is being added to a new policy, there are no selections and a name must be added. Choose a name that will group all related rules.

c Click the appropriate radio button to designate an ACL or CLEAR-Flow rule. (This button is displayed only when adding rules to a 03.00.00 version policy.)

d For additional information on rule types and class names, click the **Help** button. The same information can be found in *Appendix A* of this manual under "Type Selection Panel" on page 68.

e Click **Next**

3 From the **Available** list box, select one or more "match conditions" and use the "Arrow" icon to move each of them to the **Selected** list box.

For addition information on "match conditions", click the **Help** button. The same information can be found in *Appendix A* of this manual under "Match Condition Selection Panel" on page 69.

4 Click **Next.** A dialog box opens for the first "match condition."

5 In the text box, enter arguments for the particular "match condition.'"Note that clicking the enabled icons under the text box provides synonyms and other variable suggestions depending on which "match condition" was selected. The **Description** box also displays information consistent with the selection.

6 Click **Next.** If applicable, a dialog box opens for the next "match condition." Continue the process until arguments have been selected for each "match condition."

7 From the **Available** list box, select the desired **true or "then" action** (permit or deny) and move it to the **Selected** list box.

NOTE

"Permit" is the default, so if no action is specified in a rule entry, the packet is forwarded.

8 Click **Next.**

9 From the **Available** list box, select none or one or more "action modifiers" and move them to the **Selected** list box.

For addition information on "action modifiers", click the **Help** button. The same information can be found in *Appendix A* of this manual under "Action Modifier Selection Panel" on page 70.

10 Click **Next.** If action modifiers were selected, a dialog box opens.

11 From the **Available** list box, select the desired "arguments" for the first action modifier that was selected in Step 9, and move them to the **Selected** list box. Then click **Next** to continue the process for each action modifier.

12 Click **Next.** The text of the new rule is displayed.

13 Under the text box, check or uncheck the box **Use algorithm to insert rule in optimized location**.

- When checked (the default), the rule is ranked using an algorithm that calculates its best position in the policy based on the specifics of the ACL rules. Specific rules trigger before general rules.
- When unchecked, the rule is inserted according to its position. The user can determine the position or the rule is added to the end of the list.

14 Click **Finish**. The new rule is added to the policy and displayed in all of the rule viewing panels.

Use the following procedure to add a new rule in a given position in the listing. For example, add a new # 005 after # 004.

1 In the Rule Editing and Viewing Panel, right-click anywhere in the # 004 row. A menu is displayed.

2 Choose **Insert new rule (after)**. The **Rule Wizard** opens.

3 Follow Step 2 through Step 14 above.

Saving a Policy

Policies can be saved to a local file or to a switch.

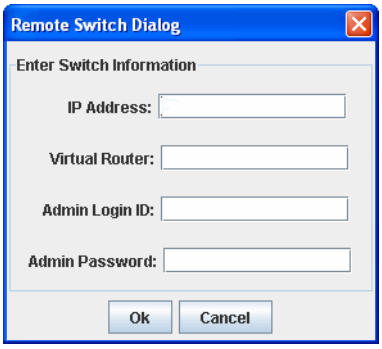
To save to a local file:

1 From the Menu Bar, choose **File > Save As > Local**. The **Save** box opens.

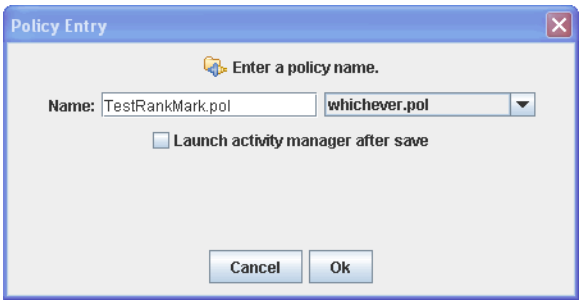
2 In the **File Name**: field, type a new policy name ending in ".pol" and click **Save**. A **Validation Notice** box is displayed that confirms the Policy rules were successfully saved and the new policy name in displayed in the Tree Structure Panel, followed by "(localfile)."

To save to a switch:

1 From the Menu Bar, choose **File > Save As > Switch**. The **Remote Switch Dialog** box opens as shown below.



2 Enter the required information (described on page 31) and click **OK**. A **Policy Entry** box opens as shown below.



3 In the **Name** text field, you have three options:

a Use the policy name of the local file you are saving that EPM displays in the text field, or

b TypeS a new policy name in the text field, or

c Select an existing policy name from the dropdown menu. The name is then displayed in the text field. Use this when replacing an existing policy with an updated one. The EPM displays a warning when it is overriding an existing policy.

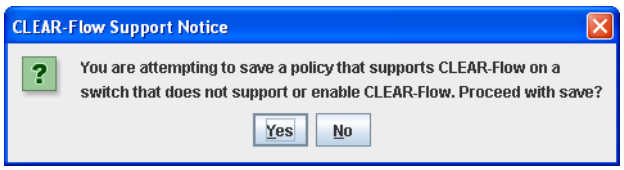
d To save the name you have chosen to display in the **Name** text field, click **OK**.

NOTE

The "Launch activity manager after save" box above refers to the Policy Activity Manager dialog box which is described on page 50.

When the policy is being saved on a switch that supports CLEAR-Flow, a **Validation Notice** confirming the save is displayed.

When the policy is being saved on a switch that does not support CLEAR-Flow (see "Switch Requirements" on page 11), a **CLEAR-Flow Support Notice** is displayed as shown below. Click **Yes** to continue the save process. CLEAR-Flow rules are displayed in the rule viewing panels but are not supported on the switch.


CLEAR-Flow Support Notice
You are attempting to save a policy that supports CLEAR-Flow on a switch that does not support or enable CLEAR-Flow. Proceed with save?
Yes
No

The saved policy name is displayed in the Tree Structure Panel followed by the IP address of the switch.

NOTE

A policy name must be an alpha-numeric string between 1 and 32 characters in length ending in '.pol.'

Validating and Checking a Policy

When a policy is created or when new rules have been added, the policy should be validated.

To validate a policy, use the following procedure.

1 From the Menu choose **Policy** > **Validate & Check** or click the icon. An **Operation Progress** box is displayed, followed by either a **Validation Notice** if the policy has passed validation or a **Policy Validation Exception** if it has not. When you are working on a switch, this function indicates that it validates the policy and checks it on the switch.

2 When the **Policy Validation Exception** box is shown, click **Show Details**. An **Exception Detail** box opens explaining why the policy did not pass validation. Possible reasons include:

- The Policy contains no rules.
- Parse Exception (Last Rule Line = 1, Last Rule = n/a, Last Metadata Line = 0) : Unable to parse policy because policy selection is invalid.
- Any of the errors you would encounter running the check policy command line directly on the switch.

Importing and Exporting Rules into a Policy

The same rule can be included in various different policies. The EPM provides the capability to import rules into the current policy from another policy or export them to another policy from the current policy. This section explains those procedures.

Use the import function when rules are to be **added** from one policy to the rules in the current policy.

Use the export function when selected rules in the current policy are to **replace** the rules in another existing policy or when a new policy is to be created and **populated** with selected rules in the current policy.

Importing Rules

Rules imported from another policy (source) into the currently open policy (target) are merged or added to the rules already in the existing policy.

To import rules into a policy, use the following procedure.

1 Open the target policy into which rules are to be imported.

2 From the Menu, choose **File > Import From... > Policy File**. The **Open** box displays the policies from which rules can be imported.

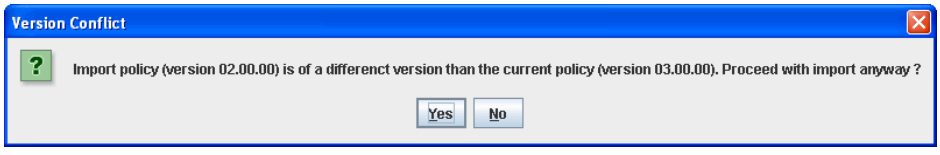
3 Select the source policy and click **Open.** The **Rule Merge Assistant** box opens as shown below.

When the rule is unique and valid, the EPM proceeds to import the rule.

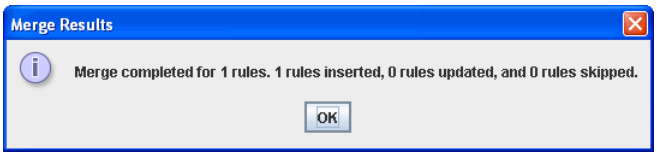
When the EPM finds a problem importing a specific rule such as finding one that is common to both policies, it prompts the user as shown in the above figure and suggests appropriate action.

4 Click the **Use custom prefix for inserted rules** box to add a prefix to the imported rules. **Dup_** is the default prefix but another can be used.

When the rule is of a different policy version, the EPM prompts the user as follows:


Version Conflict
Import policy (version 02.00.00) is of a differenct version than the current policy (version 03.00.00). Proceed with import anyway ?
Yes
No

5 Click **Yes** or **No**. The following **Merge Results** box is displayed.



6 Click **OK**. The **Rule Mark Notice** is displayed stating that Updated and inserted rules will be marked. (Refer to "Marking Rules" on page 44.)

7 Click **OK**. The new rule is displayed in all the rule viewing panels in rank order.

8 **Save** the policy.

Exporting Rules

Rules are exported from the currently open policy (the source) in two ways. They can be exported into an existing policy or into a new policy that is created as part of the export process.

To export rules into an existing policy, use the following procedure.

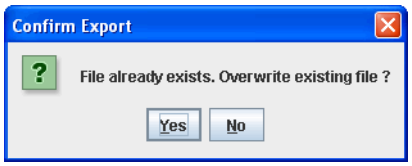
1 "Mark" one or more or all rules that are to be exported. (Refer to "Marking Rules" on page 44.) A mark icon appears next to the rule name.

NOTE

Rules must be marked to be exported.

2 From the Menu Bar, choose **File > Export To... > Policy File**. The **Save** box opens.

3 Select the target policy and click **Save**. The **Confirm Export** box opens as shown below.



4 Click **No** to cancel the process, or

Click **Yes** to overwrite the rules in the target policy. A **Validation Notice** box is displayed that confirms the Policy was successfully exported.

To export rules into a new policy, use the following procedure.

1 "Mark" one or more or all rules that are to be exported. (Refer to "Marking Rules" on page 44.) A mark icon appears next to the rule name.

2 From the Menu Bar, choose **File > Export To... > Policy File**. The **Save** box opens.

3 In the **File Name**: field, type a new policy name ending in ".pol" and click **Save**. A **Validation Notice** box is displayed that confirms the Policy rules were successfully exported and the new policy is opened with all of the rules displayed.

4 Open the new policy again to see the final new policy displaying only the marked rules.

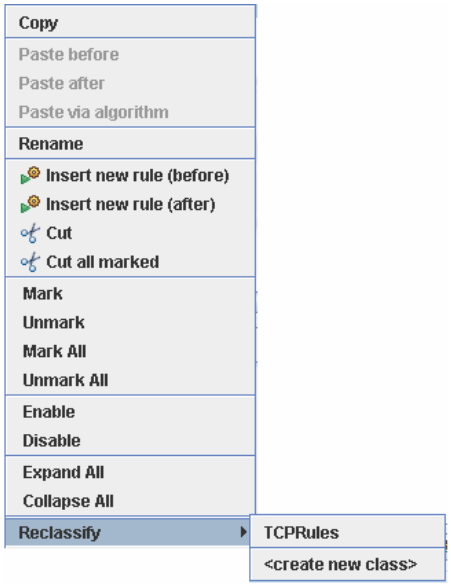
5 Modifying Policies and Rules

Introduction

The Extreme Networks Policy Manager (EPM) provides the capability to easily edit and modify existing policies and rules. This chapter describes the following sections:

- Marking Rules on page 44
- Adding and Deleting Rules in a Policy on page 44
- Modifying Rules on page 45
  - Renaming a Rule
  - Reclassifying a Rule
  - Changing Rule Parameters
- Managing Global and Policy Variables on page 48
- Organizing Rules on page 49
- Deleting Policies on page 49
- Managing Policy Activity on page 50
  - Activating and Deactivating a Policy
  - Disabling a Rule

Most editing and modifying functions are accomplished using the menu that is displayed by right-clicking a rule row in either the Rule Editing and Viewing Panel or the Rule Navigator Panel. The complete menu is shown below:



The following sections describe the procedures for these functions.

Marking Rules

The rules in the currently open policy can be marked either for reference purposes or to select specific rules for export. When a rule is marked, an icon is displayed in front of the rule name both in the Rule Editing and Viewing Panel and in the Rule Navigator window. Rules can be marked using either of the two following methods:

- In either the Rule Editing and Viewing Panel or the Rule Navigator window, right-click the desired rule and from the resulting menu, choose **Mark** for only the selected rule or **Mark All** for all of the rules in the policy.
- In the Rule Navigator window, click to select the desired rule and then click the Mark Selected Rule icon .

Marked rules can be unmarked by following the same two procedures and choosing **Unmark** or **Unmark All** from the right-click menu or in the Rule Navigator window, clicking the Clear All Marks icon .

Adding and Deleting Rules in a Policy

Once the policy has been created and populated with ACL and CLEAR-Flow rules, the EPM provides functionality to add, move and delete rules within a policy.

Adding Rules

Rules can be added to an existing policy in the following ways:

- Create a new rule as described in "Creating a New Rule for a Policy" on page 37. The new rule can be positioned in a specific location in the rule list by right-clicking an adjacent rule and from the dropdown menu, choosing either **Insert new rule (before)** or **Insert new rule (after)**. If the position is not selected, the rule is positioned according to its rank as determined by the algorithm.
- Import or export rules as described in "Importing and Exporting Rules into a Policy" on page 41.
- Copy a rule from one policy to another using the following procedure:
  - **a** In either the Rule Editing and Viewing Panel or the Rule Navigator window, right-click the desired rule and from the resulting menu, choose **Copy**.
  - **b** Open the target policy and right-click an existing rule, then choose one of the Paste functions. The copied rule is inserted and marked "Copy of..."

Deleting Rules

Rules can be deleted from either the Rule Editing and Viewing Panel listing in the Rule Editor window or from the Access Control List Rules (ACL) or CLEAR-Flow Rules (CF) panel listing in the Rule Navigator window.

Use the following procedure to delete a single rule.

1. From either list, right-click the rule that is to be deleted. The rule is highlighted and a menu is displayed.

2 From the menu, choose **Cut**. The rule is deleted.

Use the following procedure to delete more than one rule.

1 From either list, mark the rules that are to be deleted using the procedures on page 44.

2 Right-click one of the marked rules and choose **Cut all marked**. All marked rules are deleted.

NOTE

A policy must contain at least one rule. If the user attempts to delete all rules or the last rule from a policy, the changes will not be saved.

NOTE

The EPM does not support "undo."

Modifying Rules

The following changes can be made to an existing rule

Renaming a Rule

To change the name of a rule, use the following procedure:

1 In the Rule Editing and Viewing Panel or the Rule Navigator window, right-click a rule and from the menu displayed, choose **Rename**. The following dialog box is displayed.

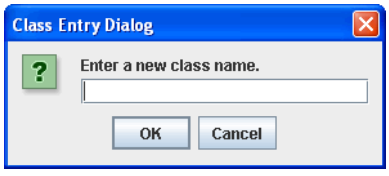
2 Enter a new name and click **OK**. The new name is displayed in the rule viewing panels.

Reclassifying a Rule

To change the class of a rule, use the following procedure:

1 Right-click a rule and from the menu displayed, choose **Reclassify**. A submenu displays available classes from which to choose or offers the choice to **<create a new class>**.

2 When **<create a new class>** is chosen, the following **Class Entry Dialog** box is displayed.



3 Enter a new class name and click **OK**. The new class is added to the rule viewing panels and the rule classification is changed.

Changing Rule Parameters

Rule parameters can be changed either during the rule creating process or after the rule is saved.

- During the rule creating process in the Rule Wizard, use the **Back** button to back up and make changes to previous parameters.
- To add, modify or delete parameters in a saved rule, use the following procedures: (These procedures modify an ACL rule. Use the same process for a CLEAR-Flow rule which uses the parameters: "Match Conditions", "Actions [True Condition]" and "Action [False Condition])".

  a In the **Rule Editing and Viewing Panel**, click the rule to be modified. The parameters are shown in the **Rule Properties Panel** under the **Rule Parameters** tab as shown below

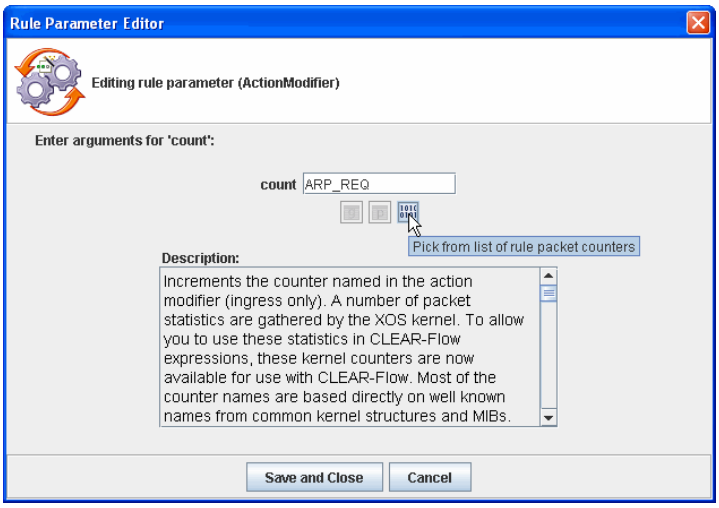
Adding parameters to a rule

a To add a new Match Condition, Action or Action Modifier, click the **Add** icon under the appropriate text box. The **Add new parameter wizard** dialog box opens. Follow the same procedure as when creating a new rule (discussed on page 38)

Modifying existing parameters in a rule

a To edit a parameter, select a parameter in either the **Match Conditions**, **Actions**, or **Action Modifiers** text box. The **Edit arguments of selected** icon is enabled when that particular parameter can be edited.

b Click the **Edit**... icon to display the **Edit arguments** dialog box that is specific to the match condition or action being edited. For example, the **Enter arguments for 'count':** box is displayed below.


Rule Parameter Editor
Editing rule parameter (ActionModifier)
Enter arguments for 'count':
count ARP_REQ
Pick from list of rule packet counters
Description:
Increments the counter named in the action modifier (ingress only). A number of packet statistics are gathered by the XOS kernel. To allow you to use these statistics in CLEAR-Flow expressions, these kernel counters are now available for use with CLEAR-Flow. Most of the counter names are based directly on well known names from common kernel structures and MIBs.
Save and Close
Cancel

To assist in the selection of arguments for count, clicking the icon as shown above, displays a list of "rule packet counters."

NOTE

The Enter arguments box provides different lists and reference options depending on which "match condition" or "action" has been selected,

c Modify the parameters as needed and then click **Save and Close**. The parameter is changed.

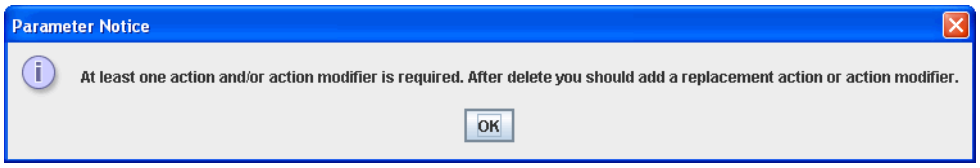
Deleting parameters from a rule.

a To delete a parameter, select a parameter in either the **Match Conditions**, **Actions**, or **Action Modifiers** text box. The **Delete selected** icon is enabled.

b Click the **Delete selected** icon. A **Confirm Delete** box is displayed, an example of which is shown below:

c Click **Yes**. The parameter is deleted from the rule.

Should the delete process be inconsistent with rule requirements, a Parameter Notice is displayed that explains the requirements. For example:


Parameter Notice
At least one action and/or action modifier is required. After delete you should add a replacement action or action modifier.
OK

d Continue the procedure as advised in the notice or cancel the process.

Applying Changes to an Activated Policy

When changes are needed in a policy that is currently activated on a switch (described on page 50), it is not necessary to deactivate the policy. The following steps incorporate changes to rules in an active policy.

1 Use any of the procedures above to add, modify or delete parameters for a saved rule.

2 From the menu, choose **Policy > Refresh**. A **Refresh Confirmation** box is displayed.

3 Click **Yes**. An **Operation Progress** box is displayed followed by a **Validation Notice** stating that the "Policy has been refreshed."

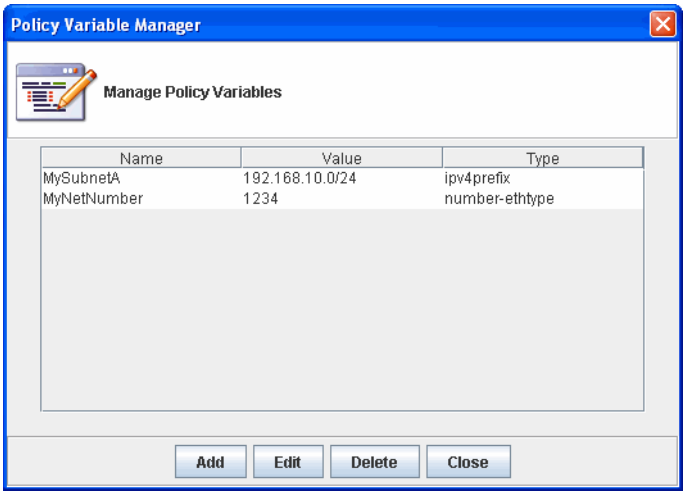
NOTE

*The submenu command, **Refresh**, is enabled only when the policy being changed is currently activated on a switch.*

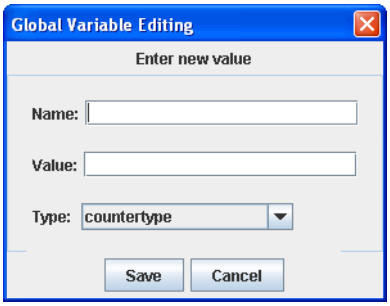
Managing Global and Policy Variables

Global and policy variables can be added, modified, and deleted. Global variables are stored on the client that runs the EPM and can be used when creating policies that are stored locally and on a switch. Policy variables apply to an individual policy. The same procedure is used to manage either of the two types of variables.

1 From the menu, click either **Tools > Global Variables...** or **Tools > Policy Variables...** The following **Global** or **Policy Variable Manager** dialog box is displayed.



2 To add a variable, click the **Add** button. To edit a variable, select the variable that is to be edited and click the **Edit** button. The following **Global** or **Policy Variable Editing** box is displayed.



3 When **Add** is selected, the **Name** and **Value** fields are blank. Enter the information and from the **Type** dropdown menu, choose a type.

When **Edit** is selected, The **Name** and **Value** fields display the current settings. Make the desired changes in the fields and in the **Type** dropdown menu.

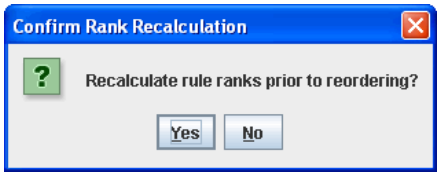
4 Click **Save**. The new entries or modifications are displayed in the **Policy** or **Global Manager Variable** box.

5 Make any additional additions or edits, then click **Close**.

Organizing Rules

Rules can be organized to function within a policy in two ways. As discussed earlier in the rule creation process (on page 38), the user can either determine the order in which the rules are to be read or call the EPM algorithm that assigns an efficient order based on the specificity of the rules. The existing rule order can then be changed in the following ways.

- Reassign rule ranks using the EPM algorithm by choosing **Policy > Recalculate rule ranks** from the menu. Use this command when rules have been added or deleted from an existing policy or when the original ranks were determined without using the algorithm.
- Rearrange the rules according to rank. by choosing **Policy > Reorder rules by rank**. When this command is chosen, the following box is displayed allowing the user to maintain the existing ranking or change it.



- Return all rules to their original order by choosing **Policy > Reorder rules by initial position**. When this command is chosen, a **Rule Location Notice** box is displayed stating that "Any new rules added since the policy was loaded will appear at the top of the rule list in all views."

Deleting Policies

Policies are deleted from the policy folder in the program files rather than through the EPM application.

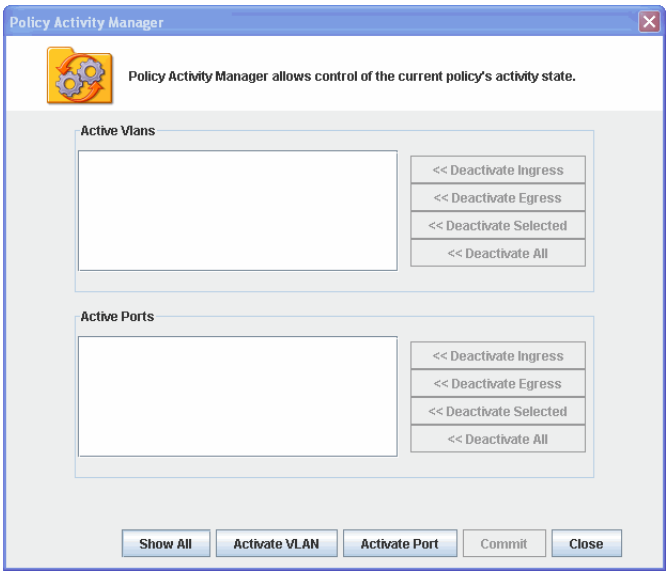
Managing Policy Activity

After a policy is saved to the switch. it does not function until it is activated. The current activity status of the policy is shown in the Status Panel under the Rule Activity tab.

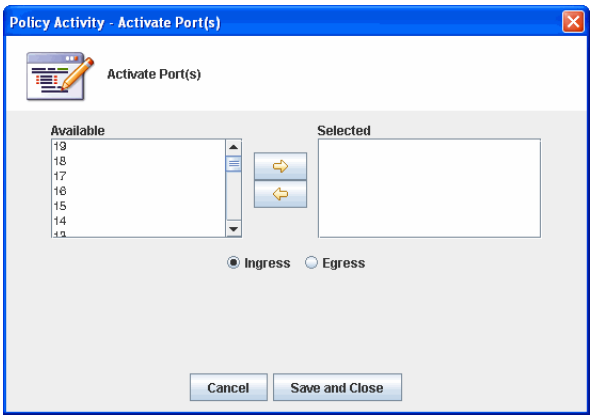
Activating and Deactivating a Policy

To activate the policy on either a port or a VLAN, use the following procedure:

1 From the menu, choose **Policy > Activity...**. A **Policy Activity Manager** dialog box is displayed as shown below.



2 To activate the policy on a port, click the **Activate Port** command button. The following **Policy Activity - Activate Port(s)** dialog box opens.



3 From the **Available** list of ports, select a port and using the arrow command button transfer it to the **Selected** text box. Select additional ports as needed. Click the **Ingress** or **Egress** radio buttons and then **Save and Close**. The box closes and in the **Active Ports** panel, the port number, ingress or egress and the Policy name are displayed.

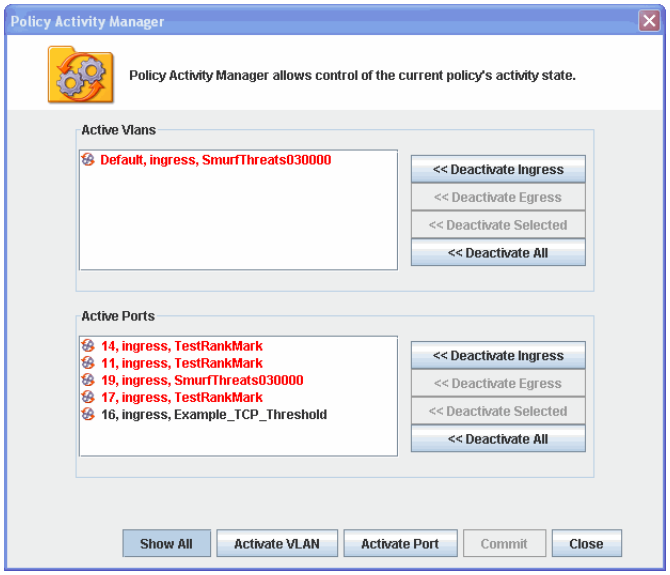
4 Continue the process, selecting additional ports (egress or ingress) and VLANs as desired. All are displayed in the **Policy Activity Manager** dialog box.

5 When all desired ports and VLANs have been selected, click the now enabled **Commit** command button and when the process is completed, **Close** the box. Under the **Rule Activity** tab, the port and VLAN commitments are shown.

To view all the policies that are currently committed to the ports or VLANs, use the following procedure.

1 Choose **Policy > Activity...** to open the **Policy Activity Manager** dialog box.

2 Click the **Show All** command button to view the following dialog box. The Show All button is a toggle button that, when selected, shows the VLANs and ports that are activated for policies other than the policy that is currently loaded in the EPM. All VLANs and ports that are active for the current policy are shown in black, and all other active VLANs and ports are shown in red.



The **Active Vlans** field displays the name of each active VLAN, the direction (egress or ingress), and the name of the policy activated on that VLAN.
The **Active Ports** field displays the number of each active port, the direction, and the name of the policy activated on that port.

3 To return to the current policy only, click the **Show All** button again.

To modify these commitments, use the following procedures:

1 Choose **Policy > Activity...** to open the **Policy Activity Manager** dialog box. The commitments for the current policy are shown.

2 The deactivate command buttons show the available options. Click the desired option (**Deactivate Ingress**, **Deactivate Egress**, **Deactivate Selected**, or **Deactivate All**) then click the **Commit** command button. The policies are deactivated.

Disabling a Rule

Rules are normally enabled with the policy. However, one or more individual rules within a policy can be disabled by using the following procedure:

1 In the Rule Editing and Viewing Panel or the Rule Navigator Window, right-click the rule to be disabled and from the resulting menu, choose **Disable**. The rule appears in red.

2 To re-enable the rule, repeat the process in Step 1, selecting **Enable** from the menu.

6 Running Extreme Networks Policy Manager Examples

Introduction

This chapter describes some of the functionality of the Extreme Networks Policy Manager (EPM) using two examples. The examples use two sample policies that are included with the EPM application.

NOTE

Each of the following two examples consists of a series of connected procedures. Each procedure begins in the state where the previous one ended. If a procedure is used out of the order that is displayed here, the results may be affected.

Example 1—Example_TCP_Threshold.pol

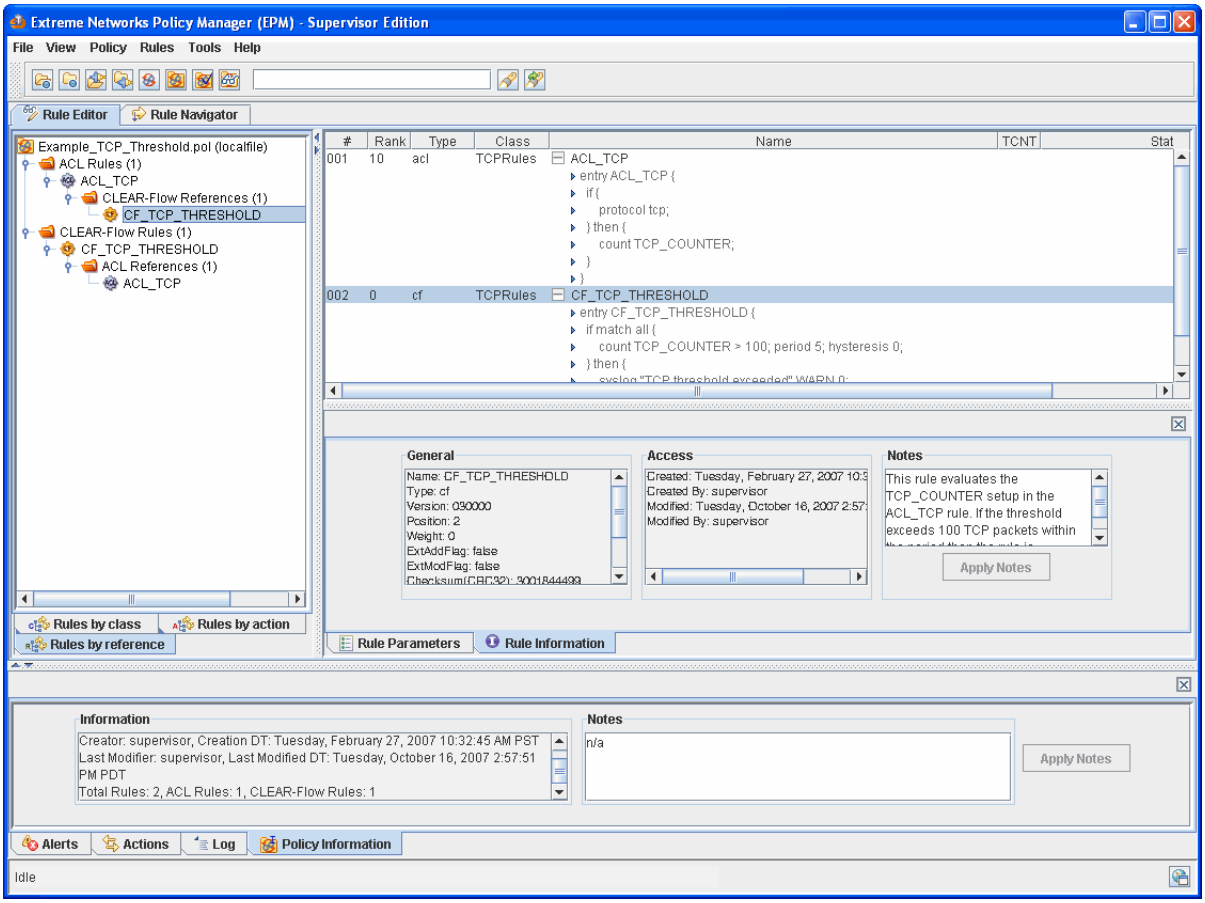
This TCP_Threshold example is a simple policy demonstrating the ability to show CLEAR-Flow rules that detect TCP traffic that exceeds a minimum threshold.

Open and View the Policy

1. Start by opening the EPM
2. From the menu, choose **File > Open > Local**. The file **Open** Box is displayed.
3. Navigate to epm_supervisor\policy_files\examples and **Open** "Example_TCP_Threshold.pol." The policy has two rules: "ACL_TCP" and "CF_TCP_THRESHOLD."
4. In the Rule Editor window, set the following views as shown in the screen below.
   a. In the Tree Structure Panel, click the **Rules by Reference** tab. This shows that the two rules are connected.
   b. In the Rule Editing and View Panel, either click the "+" to the right of the rule name or right-click the rule and choose **Expand All** from the resulting dropdown menu. This expands the rules to view the raw rule text that shows a common rule element—"count TCP_COUNTER." The CLEAR-Flow rule extends the action of the ACL rule.
5. Check other available information. For example:
   a. In the Status Panel, under the Policy Information tab, information about the creation, modification and use of the policy is displayed.
   b. In the Rule Properties Panel under the Rule Information tab, similar information for the rule(s) is displayed.

      When ACL_TCP is selected, information in the Notes field reads: "This rule creates a counter that is used by the CLEAR-Flow rule when evaluating the TCP packet threshold."

      When CF_TCP_THRESHOLD is selected, the information reads: "This rule evaluates the TCP_COUNTER setup in the ACL_TCP rule. If the threshold exceeds 100 TCP packets within the period then the rule is triggered."



Save to a Switch

1 Before saving a policy to a switch, make certain that the configuration steps, as described on page 11 and on page 18 have been taken.

2 From the menu, choose **File > Save As > Switch**.

3 In the **Remote Switch Dialog** box, enter the required information. (For more detail, see "To Save to a Switch on page 39.")

4 When the **Policy Entry** dialog box opens, it prompts with the policy name that was used locally. That name is accepted here by clicking **OK**. (For other options, see "Saving a Policy" on page 39.)

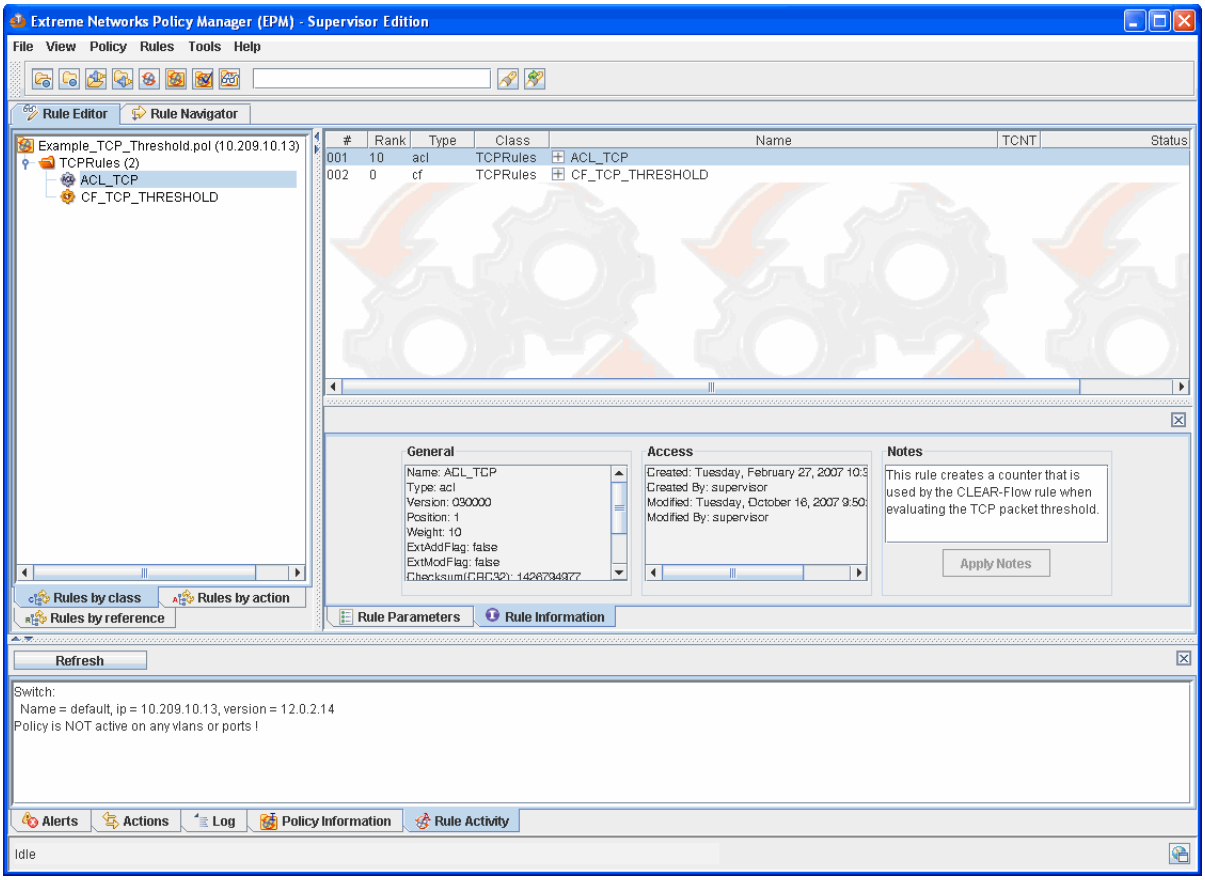
This box includes an option to open the **Activity Manager** dialog after the policy is saved. In this case, it was not selected.

(This example is being run on a switch that does not support CLEAR-Flow. Therefore, a **CLEAR-Flow Support Notice** box opens with a reminder of that limitation and the question of whether to proceed. **Yes** is selected.)

5 When the policy is saved, several changes occur:

- A notice is displayed confirming the save;
- The switch's IP address is displayed in the Tree Structure Panel to the right of the policy name, replacing "localfile";
- The Rule Activity tab is displayed in the Status Panel.

The Rule Editor window now appears as follows:

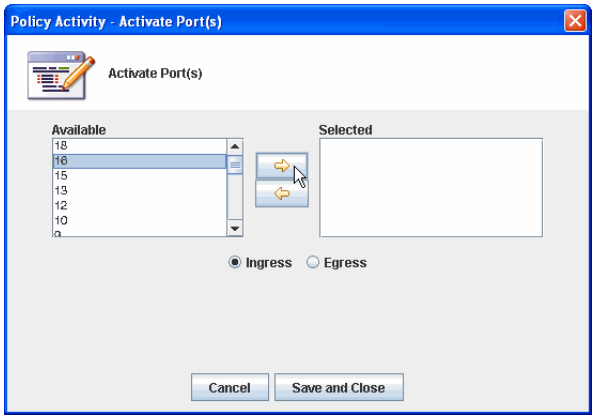


Activate the Policy on a Port

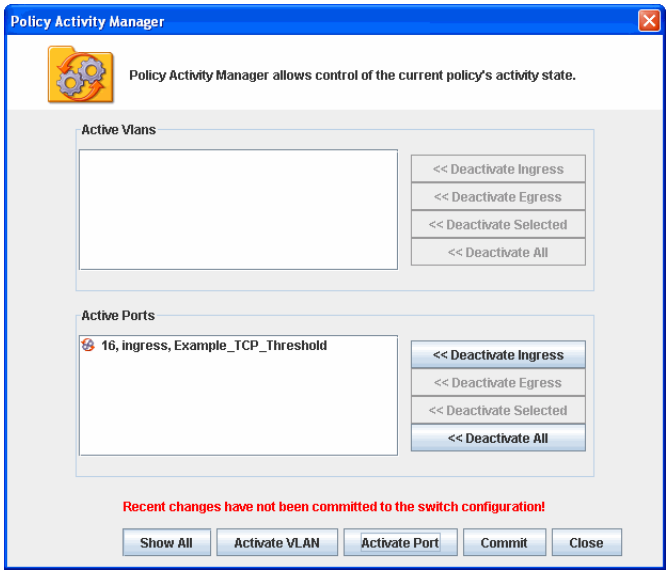
Observe in the screen above, under the Rule Activity tab of the Status Panel, that the policy is not active on any VLANs or ports. This section describes the procedure to activate the policy.

1 From the menu, choose **Policy > Activity...**. The **Policy Activity Manager** dialog box opens.

2 Click the **Activate Port** command button. The **Policy Activity - Activate Port(s)** dialog box opens as shown below.



3 Transfer port **16** from the **Available** list to the **Selected** box using the arrow command buttons. Click the **Ingress** radio button and then **Save and Close**. Port 16 is now displayed in the **Active Ports** field as shown below.

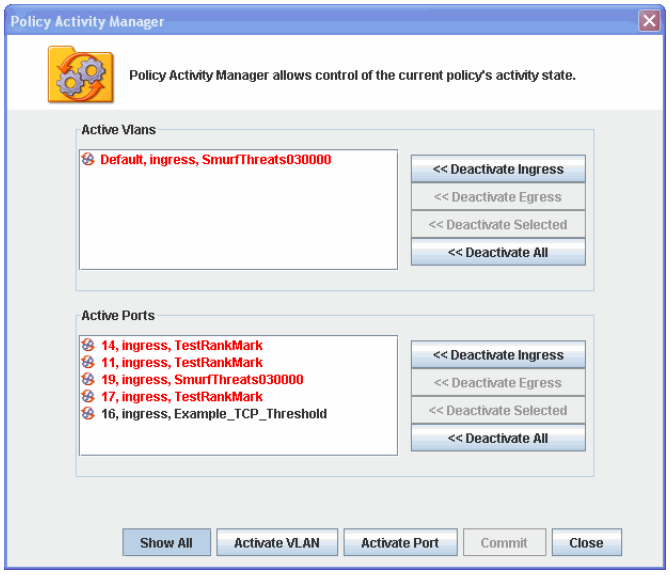


4 See the notation in red stating that "Recent changes have not been committed to the switch configuration!" Click the **Commit** command button. A **Commit Confirmation** box opens.

5 Click **Yes**. The now disabled **Commit** command button indicates that the changes have been committed to the switch.

6 See the change also in the Status Panel. It shows that the policy is activated on Port 16 and the direction is ingress.

7 Click the **Show All** command button. As shown below, the current policy is shown in black, and all other ports and/or VLANs with activated policies are shown in red.



8 Click the **Show All** command button again to show only the currently edited policy.

9 **Close** the dialog box.

Modify Rule Parameters

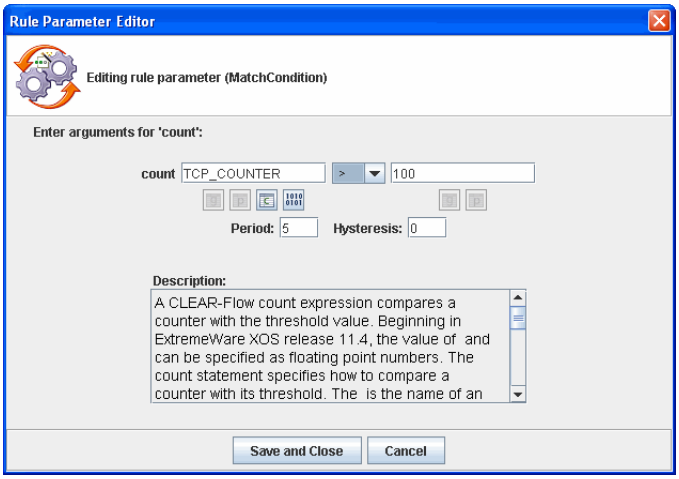
To modify any of the existing rule parameters, use the following procedure. For this example, in the CF_TCP_THRESHOLD rule, the argument of 100 packets for the "count" parameter is changed to 200 packets.

1 Open the policy "Example_TCP_Threshold.pol."

2 In the Rule Editing and Viewing Panel, select the rule, "CF_TCP_THRESHOLD." In the Rule Properties Panel under the Rule Parameters tab, the parameters are displayed.

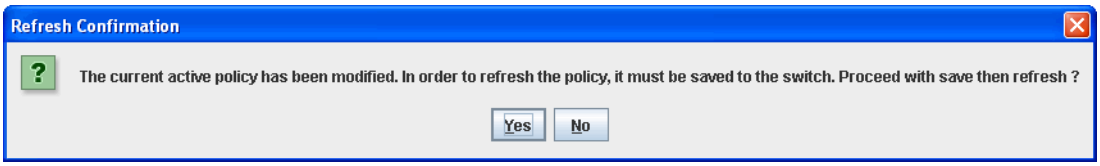
3 In the Rule Parameters, under "Match Conditions" click "count TCP_COUNTER>100, period 5, hysteresis 0;" All the icons under the text panel are enabled.

4 Click the "Edit arguments of selected" icon . The **Rule Parameter Editor** dialog box is displayed as shown below.


Rule Parameter Editor
Editing rule parameter (MatchCondition)
Enter arguments for 'count':
count
TCP_COUNTER
>
100
Period:
5
Hysteresis:
0
Description:
A CLEAR-Flow count expression compares a counter with the threshold value. Beginning in ExtremeWare XOS release 11.4, the value of and can be specified as floating point numbers. The count statement specifies how to compare a counter with its threshold. The is the name of an
Save and Close
Cancel

5 Replace "100" with "200" then click **Save and Close**. The change is displayed in the "Match Conditions" text panel and in the raw rule text of the other rule viewing panels.

6 From the menu, choose **Policy > Refresh**. The following **Refresh Confirmation** box is displayed.


Refresh Confirmation
The current active policy has been modified. In order to refresh the policy, it must be saved to the switch. Proceed with save then refresh ?
Yes
No

7 Click **Yes**. An **Operation Progress** box is displayed followed by a **Validation Notice** stating that the "Policy has been refreshed."

NOTE

*The submenu command, **Refresh**, is enabled only when the policy being changed is currently activated on a switch.*

8 **Exit** the EPM.

Example 2—Example_TCP_UDP_Balance.pol

This example uses two ACL rules and one CLEAR-Flow rule to track the ratio of TCP to UCP packets.

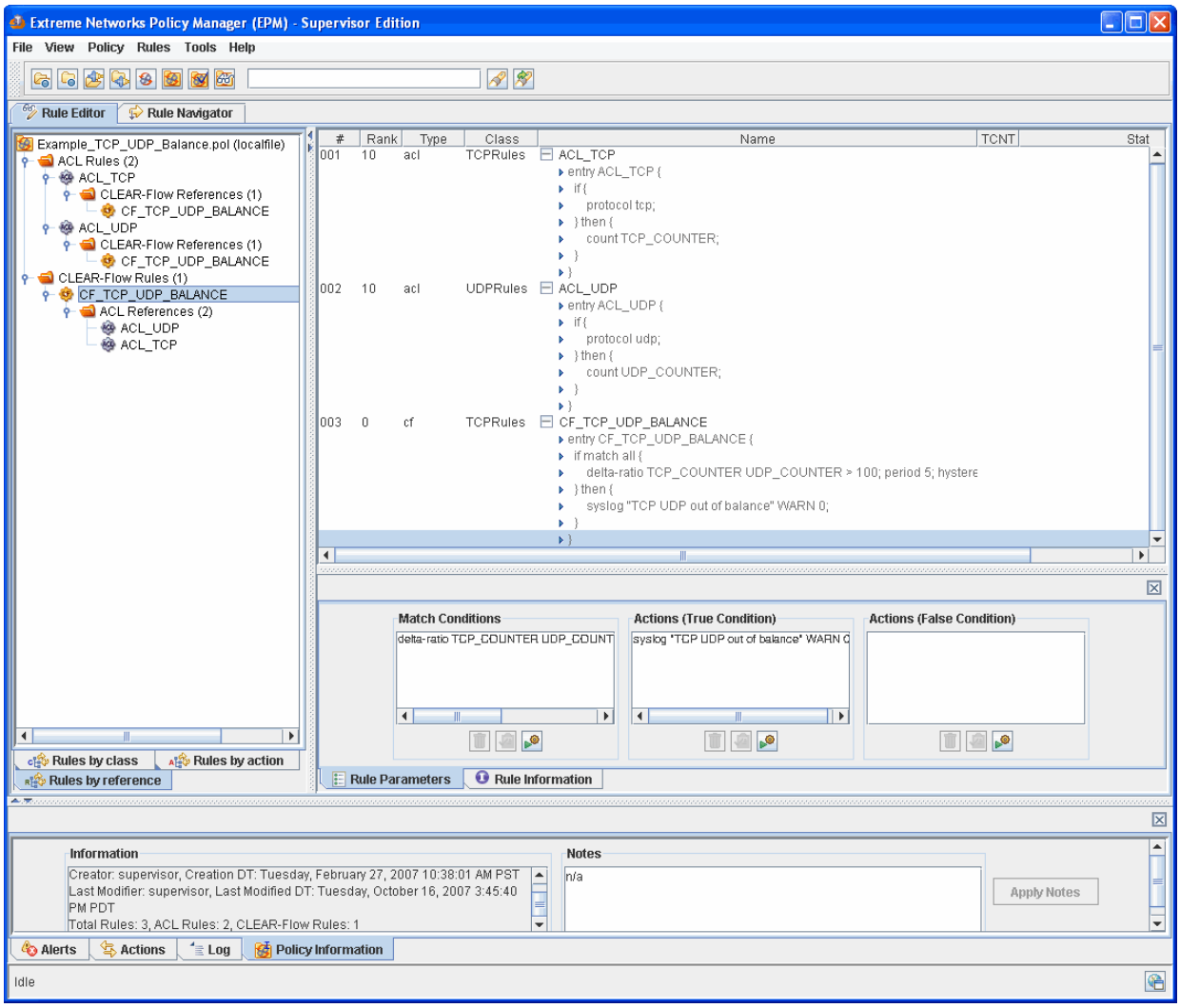
Open and View the Policy

1 Open the policy, "Example_TCP_UDP_Balance.pol" as a local file.

2 In the Tree Structure Panel under the **Rules by reference** tab, note the connections among the three rules.

3 Expand the rules in the Rule Editing and Viewing Panel to view the raw rule text. (You may have to extend the window downwards and the lower panels to view all three of the expanded rules at once.)

4 Note from both views that the CLEAR-Flow rule is connected to both ACL rules and is ineffective without both. The screen below displays these features.



5 Click the Rules by class tab to see the relationship between the two classes and the three rules.

Search for a Rule

The EPM provides the ability to search through the rules in a large policy to find one or more that fit given criteria. Suppose there are one or more particularly useful and workable rules that the user would like to use again, perhaps with modifications, in a new policy. Rather that recreating the rule(s), the user can search for the desired rule, and then depending on the need, use the copy, import or export commands to incorporate the rule(s) into another policy. While the particular policy used here has only a few rules, the procedure is the same in a larger policy.

In this example, the user is looking for a ACL rule with a "COUNTER" action to be referenced with a CLEAR-Flow rule. To find it, use the following procedure:

1 From the tool bar, click the "Search Policy" icon . The **Search Policy** dialog box opens.

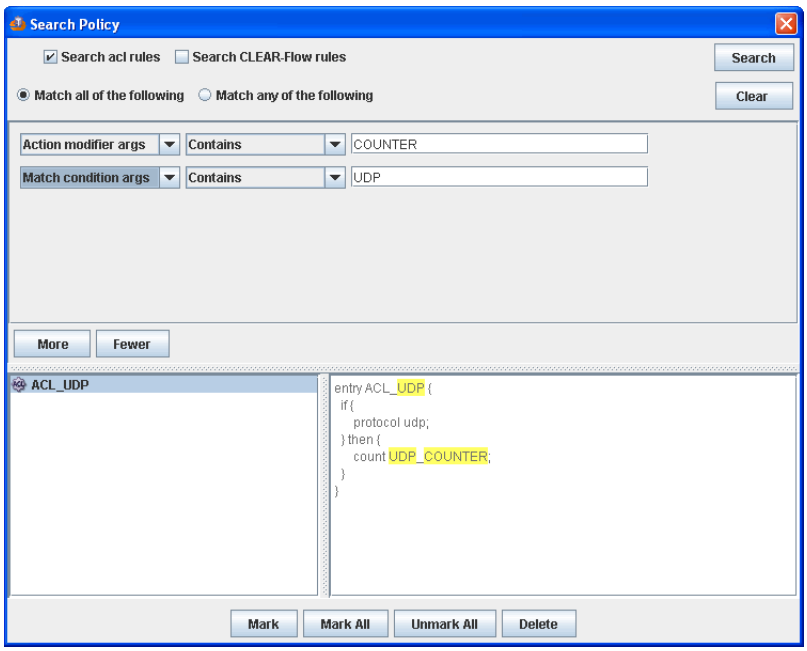
2 Deselect the **Search CLEAR-Flow rules** check box and click the **More** command button. A search criteria row of three fields is displayed.

3 From the Rule Name dropdown menu, choose **Action modifier args;** leave the **Contains** list as is, and type "COUNTER" in the text field. Then click **Search**. Two rules matching the criteria (ACL_UDP and ACL_TCP) are displayed in the lower left text box.

4 Click one of the rules. The raw rule text is displayed in the right box with COUNTER highlighted. It is also displayed in the other rule viewing panels.

5 When there are many hits, use another criterion to refine the search, in this case, to specify the UDF protocol. Click **More** and a new search criteria row is displayed.

6 From the Rule Name menu, choose **Match condition arg**s; leave the **Contains** list as is, and type UDP in the text field. Then click **Search**. The following screen is displayed showing both criteria highlighted.



NOTE

The search function is not case-sensitive, but the highlighting function is.

7 Close the **Search Policy** box. (The search procedure is not saved.)

Incorporate into a Policy

When the single rule that was found is to be added to an existing policy, the copy/paste function is probably most efficient. Use the following procedure.

1 Right-click the now selected rule and choose **Copy** from the resulting menu. Close the current (or source) policy and open the policy into which the rule is to be copied (target). Right-click an existing rule and choose the desired **Paste** command from the menu.

NOTE

The Copy/Paste function can be used only with an already populated policy.

When one or more rules that were found are to be the beginning of a new policy, the export function simplifies the process. Use the following procedure.

1 In this example, mark the rule either from the **Search Policy** box, before closing, or from the right-click menu. From the menu, choose **File > Export To... > Policy File**. In the **Save** box that opens, type a new file name (in this case **ExportTest.pol**) and click **Save**. When the export is successful, a **Validation Notice** is displayed confirming the export. Click **OK**. From the menu, choose **File > Open > Local** and select ExportTest.pol to see the new policy with the rule, ACL_UDP. Additional rules can be added either by creating new ones, using copy/paste from other policies, importing and/or exporting.

2 When the new policy is complete, it can be validated. From the menu, choose **Policy > Validate & Check.** The EPM checks the policy and validates it or returns notice of problems.

3 Save the new policy to a switch when it is complete.

4 **Exit** the EPM.

A Help Messages

Introduction

This appendix includes Help messages and other reference material that appear in the Extreme Networks Policy Manager (EPM). These are cross-referenced in this manual from the procedure to which they apply.

For additional description of this material, refer to the *ExtremeXOS Concepts Guide* and the *ExtremeXOS Command Reference Guide*.

Included are:

- Predefined CLEAR-Flow System Counters on page 63
- Synonyms used for Rule Constants on page 65
- Type Selection Panel on page 68
- Match Condition Selection Panel on page 69
- Action Modifier Selection Panel on page 70
- True Action Selection Panel on page 75
- Match Condition Selection Panel on page 75

Predefined CLEAR-Flow System Counters

Name	Type
sys_IpInReceives	counterreference
sys_IpInHdrErrors	counterreference
sys_IpInAddrErrors	counterreference
sys_IpForwDatagrams	counterreference
sys_IpInUnknownProtos	counterreference
sys_IpInDiscards	counterreference
sys_IpInDelivers	counterreference
sys_IpOutRequests	counterreference
sys_IpOutDiscards	counterreference
sys_IpOutNoRoutes	counterreference
sys_IpReasmTimeout	counterreference
sys_IpReasmReqds	counterreference
sys_IpReasmFails	counterreference
sys_IpFragOKs	counterreference
sys_IpFragFalls	counterreference
sys_IpFragCreates	counterreference

sys_IcmpInErrors	counterreference
sys_IcmpInDestUnreachs	counterreference
sys_IcmpInTimeExcds	counterreference
sys_IcmpInParmProbs	counterreference
sys_IcmpInSrcQuenchs	counterreference
sys_IcmpInRedirects	counterreference
sys_IcmpInEchos	counterreference
sys_IcmpInEchoReps	counterreference
sys_IcmpInTimestamps	counterreference
sys_IcmpInTimestampReps	counterreference
sys_IcmpInAddrMasks	counterreference
sys_IcmpInAddrMaskReps	counterreference
sys_IcmpOutMsgs	counterreference
sys_IcmpOutErrors	counterreference
sys_IcmpOutDestUnreachs	counterreference
sys_IcmpOutTimeExcds	counterreference
sys_IcmpOutParmProbs	counterreference
sys_IcmpOutSrcQuenchs	counterreference
sys_IcmpOutRedirects	counterreference
sys_IcmpOutEchos	counterreference
sys_IcmpOutEchoReps	counterreference
sys_IcmpOutTimestamps	counterreference
sys_IcmpOutTimestampReps	counterreference
sys_IcmpOutAddrMasks	counterreference
sys_IcmpOutAddrMaskReps	counterreference
sys_IcmpInProtoUnreachs	counterreference
sys_IcmpInBadLen	counterreference
sys_IcmpInBadCode	counterreference
sys_IcmpInTooShort	counterreference
SYS_IcmpOutProtoUnreachs	counterreference
sys_IcmpOutRouterAdv	counterreference
sys_IgmpInQueries	counterreference
sys_IgmpInReports	counterreference
sys_IgmpInLeaves	counterreference
sys_IgmpInErrors	counterreference
sys_IgmpOutQueries	counterreference
sys_IgmpOutReports	counterreference
sys_IgmpOutLeaves	counterreference

Synonyms used for Rule Constants

Name	Description	Value	Type
qp1	QOC Profile Names	qp1	qpxname
qp2	QOC Profile Names	qp2	qpxname
qp3	QOC Profile Names	qp3	qpxname
qp4	QOC Profile Names	qp4	qpxname
qp5	QOC Profile Names	qp5	qpxname
qp6	QOC Profile Names	qp6	qpxname
qp7	QOC Profile Names	qp7	qpxname
qp8	QOC Profile Names	qp8	qpxname
add	Mirror modes	add	mirrormode
delete	Mirror modes	delete	mirrormode
DEBU	Syslog Levels	DEBU	level-syslog
INFO	Syslog Levels	INFO	level-syslog
NOTI	Syslog Levels	NOTI	level-syslog
WARN	Syslog Levels	WARN	level-syslog
ERRO	Syslog Levels	ERRO	level-syslog
CRIT	Syslog Levels	CRIT	level-syslog
ACK	TCP Flags	0x10	bitfield-tcpflags
FIN	TCP Flags	0x01	bitfield-tcpflags
PUSH	TCP Flags	0x08	bitfield-tcpflags
RST	TCP Flags	0x04	bitfield-tcpflags
SYN	TCP Flags	0x02	bitfield-tcpflags
URG	TCP Flags	0x20	bitfield-tcpflags
SYN_ACK	TCP Flags	0x12	bitfield-tcpflags
ETHER-P-IP	Ethernet Types	0x0800	number-ethtype
ETHER-P-8021Q	Ethernet Types	0x8100	number-ethtype
ETHER-P-IPV6	Ethernet Types	0x86DD	number-ethtype
egp	Protocols	8	number-protocol
esp	Protocols	5	number-protocol
gre	Protocols	47	number-protocol
icmp	Protocols	1	number-protocol
igmp	Protocols	2	number-protocol
ipip	Protocols	4	number-protocol
ipv6	Protocols	41	number-protocol
ospf	Protocols	89	number-protocol
pim	Protocols	102	number-protocol
rsvp	Protocols	46	number-protocol
tcp	Protocols	6	number-protocol
udp	Protocols	17	number-protocol
afs	Service Ports	1483	numberrange-port

bgp	Service Ports	179	numberrange-port
biff	Service Ports	512	numberrange-port
bootpc	Service Ports	68	numberrange-port
bootps	Service Ports	67	numberrange-port
cmd	Service Ports	514	numberrange-port
cvspserver	Service Ports	2401	numberrange-port
DHCP	Service Ports	67	numberrange-port
domain	Service Ports	53	numberrange-port
eklogin	Service Ports	2105	numberrange-port
ekshell	Service Ports	2106	numberrange-port
exec	Service Ports	512	numberrange-port
finger	Service Ports	79	numberrange-port
ftp	Service Ports	21	numberrange-port
ftp-date	Service Ports	20	numberrange-port
http	Service Ports	80	numberrange-port
https	Service Ports	443	numberrange-port
ident	Service Ports	113	numberrange-port
imap	Service Ports	143	numberrange-port
kerberos-sec	Service Ports	88	numberrange-port
klogin	Service Ports	543	numberrange-port
kpasswd	Service Ports	761	numberrange-port
krb-prop	Service Ports	754	numberrange-port
krbupdate	Service Ports	760	numberrange-port
kshell	Service Ports	544	numberrange-port
idap	Service Ports	389	numberrange-port
login	Service Ports	513	numberrange-port
mobileip-agent	Service Ports	434	numberrange-port
mobileip-mn	Service Ports	435	numberrange-port
msdp	Service Ports	639	numberrange-port
netbios-dgm	Service Ports	138	numberrange-port
netbios-ns	Service Ports	137	numberrange-port
netbios-ssn	Service Ports	139	numberrange-port
nfsd	Service Ports	2049	numberrange-port
nntp	Service Ports	119	numberrange-port
ntalk	Service Ports	513	numberrange-port
ntp	Service Ports	123	numberrange-port
pop3	Service Ports	110	numberrange-port
pptp	Service Ports	1723	numberrange-port
printer	Service Ports	515	numberrange-port
radacct	Service Ports	1813	numberrange-port
radius	Service Ports	1812	numberrange-port
rip	Service Ports	520	numberrange-port
rkinit	Service Ports	2108	numberrange-port

smtp	Service Ports	25	numberrange-port
snmp	Service Ports	161	numberrange-port
snmptrap	Service Ports	162	numberrange-port
snpp	Service Ports	444	numberrange-port
socks	Service Ports	1080	numberrange-port
ssh	Service Ports	22	numberrange-port
sunrpc	Service Ports	111	numberrange-port
syslog	Service Ports	514	numberrange-port
facacs-ds	Service Ports	65	numberrange-port
talk	Service Ports	517	numberrange-port
telnet	Service Ports	23	numberrange-port
tftp	Service Ports	69	numberrange-port
timed	Service Ports	525	numberrange-port
who	Service Ports	513	numberrange-port
xdmcp	Service Ports	177	numberrange-port
zephyr-cit	Service Ports	2103	numberrange-port
zephyr-hm	Service Ports	2104	numberrange-port
v1-report	IGMP Message Types	0x12	number-igmptype
v2-report	IGMP Message Types	0x16	number-igmptype
v3-report	IGMP Message Types	0x22	number-igmptype
v2-leave	IGMP Message Types	0x17	number-igmptype
query	IGMP Message Types	0x11	number-igmptype
echo-reply	ICMP Types	0	number-icmptype
echo-request	ICMP Types	8	number-icmptype
info-reply	ICMP Types	18	number-icmptype
info-request	ICMP Types	15	number-icmptype
mask-request	ICMP Types	17	number-icmptype
mask-reply	ICMP Types	18	number-icmptype
parameter-problem	ICMP Types	12	number-icmptype
redirect	ICMP Types	5	number-icmptype
router-advertisement	ICMP Types	9	number-icmptype
router-solicit	ICMP Types	10	number-icmptype
source-quench	ICMP Types	4	number-icmptype
time-exceeded	ICMP Types	11	number-icmptype
timestamp	ICMP Types	13	number-icmptype
timestamp-reply	ICMP Types	14	number-icmptype
unreachable	ICMP Types	3	number-icmptype
ip-header-bad	ICMP Codes	0	number-icmpcode
required-option-missing	ICMP Codes	1	number-icmpcode
redirect-for-host	ICMP Codes	1	number-icmpcode
redirect-for-network	ICMP Codes	2	number-icmpcode
redirect-for-tos-and-host	ICMP Codes	3	number-icmpcode
redirect-for-tos-and-net	ICMP Codes	2	number-icmpcode

ttl-eq-zero-during reassembly	ICMP Codes	1	number-icmpcode
ttl-eq-zero-during-transit	ICMP Codes	0	number-icmpcode
communication-prohibited-by-filtering	ICMP Codes	13	number-icmpcode
destination-host-prohibited	ICMP Codes	10	number-icmpcode
destination-host-unknown	ICMP Codes	7	number-icmpcode
destination-network-prohibited	ICMP Codes	9	number-icmpcode
destination-network-unknown	ICMP Codes	6	number-icmpcode
fragmentation-needed	ICMP Codes	4	number-icmpcode
host-precedence-violation	ICMP Codes	14	number-icmpcode
host-unreachable-for-TOS	ICMP Codes	12	number-icmpcode
network-unreachable	ICMP Codes	0	number-icmpcode
network-unreachable-for-TOS	ICMP Codes	11	number-icmpcode
port-unreachable	ICMP Codes	3	number-icmpcode
precedence-cutoff-in-effect	ICMP Codes	15	number-icmpcode
protocol-unreachable	ICMP Codes	2	number-icmpcode
source-host-isolated	ICMP Codes	8	number-icmpcode
source-route-failed	ICMP Codes	5	number-icmpcode
minimize-delay	IPTOS	16	number-iptos
maximize-reliability	IPTOS	4	number-iptos
minimize-cost	IPTOS	2	number-iptos
normal-service	IPTOS	0	number-iptos
af11	DSCP	10	number_dscp
af12	DSCP	12	number_dscp
af13	DSCP	14	number_dscp
af21	DSCP	18	number_dscp
af22	DSCP	20	number_dscp
af23	DSCP	22	number_dscp
af31	DSCP	26	number_dscp
af32	DSCP	28	number_dscp
af33	DSCP	30	number_dscp
af41	DSCP	34	number_dscp
af42	DSCP	36	number_dscp
af43	DSCP	38	number_dscp
ef	DSCP	46	number_dscp

Type Selection Panel

This panel allows the user to select the rule type. You may choose to create an ACL rule or CLEAR-Flow rule. Some policy versions do not support CLEAR-Flow rules, so you will NOT see a selection choice for versions the do not support CLEAR-Flow. You must select or enter a class name for the new rule. Rules are organized by class to make grouping of rules easier. Give your rule a name that you can use to group all related rules. For example, you can create a set of ACL rules that increment counters for ICMP echo request and unreachable packets, then create CLEAR-Flow rules to monitor the delta ratios for these counters. This collection of rules could be grouped under a class name of 'IcmpThreatRules' for instance.

Match Condition Selection Panel

This panel allows you to select from a list of match conditions. A choice of several match conditions is available:

ethernet-type:	Ethernet packet type. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): ETHER-P-IP (0x0800), ETHER-P-8021Q (0x8100), ETHER-P-IPV6 (0x86DD).
ethernet-source-address	Ethernet source MAC address.
ethernet-destination-address	Ethernet destination MAC address and mask. The mask is optional, and is in the same format as the MAC address. Only those bits of the MAC address whose corresponding bit in the mask is set to 1 will be used as match criteria. So, the example above will match 00:01:02:03:xx:xx. If the mask is not supplied then it will be assumed to be ff:ff:ff:ff:ff:ff. In other words, all bits of the MAC address will be used for matching.
source-address:	IP source address and mask. Egress ACLs do not support IPv6 addresses, only IPv4 addresses. Use either all IPv4 or all IPv6 addresses in an ACL.
destination-address:	IP destination address and mask. Egress ACLs do not support IPv6 addresses, only IPv4 addresses. Use either all IPv4 or all IPv6 addresses in an ACL.
protocol:	IP protocol field. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): egp(8), esp(5), gre(47), icmp(1), igmp(2), ipip(4), ipv6(41), ospf(89), pim(102), rsvp(46), tcp(6), or udp(17).
fragments:	BlackDiamond 10K and BlackDiamond 12804 only. Specifies IP fragmented packet. FO > 0 (FO = Fragment Offset in IP header).
first-fragments:	Non-IP fragmented packet or first fragmented packet. FO==0.
source-port:	TCP or UDP source port. In place of the numeric value, you can specify one of the text synonyms. Normally, you specify this match in conjunction with the protocol match to determine which protocol is being used on the port. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): afs(1483), bgp(179), biff(512), bootpc(68), bootps(67), cmd(514), cvspserver(2401), DHCP(67), domain(53), eklogin(2105), ekshell(2106), exec(512), finger(79), ftp(21), ftp-data(20), http(80), https(443), ident(113), imap(143), kerberos-sec(88), klogin(543), kpasswd(761), krb-prop(754), krbupdate(760), kshell(544), idap(389), login(513), mobileip-agent(434), mobileip-mn(435), msdp(639), netbios-dgm(138), netbiosns(137), netbios-ssn(139), nfsd(2049), nntp(119), ntalk(518), ntp(123), pop3(110), pptp(1723), printer(515), radacct(1813), radius(1812), rip(520), rkinit(2108), smtp(25), snmp(161), snmptrap(162), snpp(444), socks(1080), ssh(22), sunrpc(111), syslog(514), tacacs-ds(65), talk(517), telnet(23), tftp(69), timed(525), who(513), xdmcp(177), zephyr-clt(2103), or zephyr-hm(2104).
destination-port:	TCP or UDP destination port. Normally, you specify this match in conjunction with the protocol match to determine which protocol is being used on the port. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): afs(1483), bgp(179), biff(512), bootpc(68), bootps(67), cmd(514), cvspserver(2401), DHCP(67), domain(53), eklogin(2105), ekshell(2106), exec(512), finger(79), ftp(21), ftp-data(20), http(80), https(443), ident(113), imap(143), kerberos-sec(88), klogin(543), kpasswd(761), krb-prop(754), krbupdate(760), kshell(544), idap(389), login(513), mobileip-agent(434), mobileip-mn(435), msdp(639), netbios-dgm(138), netbiosns(137), netbios-ssn(139), nfsd(2049), nntp(119), ntalk(518), ntp(123), pop3(110), pptp(1723), printer(515), radacct(1813), radius(1812), rip(520), rkinit(2108), smtp(25), snmp(161), snmptrap(162), snpp(444), socks(1080), ssh(22), sunrpc(111), syslog(514), tacacs-ds(65), talk(517), telnet(23), tftp(69), timed(525), who(513), xdmcp(177), zephyr-clt(2103), or zephyr-hm(2104).
tcp-flags:	TCP flags. Normally, you specify this match in conjunction with the protocol match statement. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): ACK(0x10), FIN(0x01), PUSH(0x08), RST(0x04), SYN(0x02), URG(0x20), SYN_ACK(0x12).
igmp-msg-type:	IGMP message type. Possible values and text synonyms: v1- report(0x12), v2-report(0x16), v3-report(0x22), V2-leave (0x17), or query(0x11).

icmp-type:	ICMP type field. Normally, you specify this match in conjunction with the protocol match statement. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): echo-reply(0), echorequest(8), info-reply(16), info-request(15), mask-request(17), mask-reply(18), parameter-problem(12), redirect(5), routeradvertisement(9), router-solicit(10), source-quench(4), timeexceeded(11), timestamp(13), timestamp-reply(14), or unreachable(3).
icmp-code:	ICMP code field. This value or keyword provides more specific information than the icmp-type. Because the value's meaning depends upon the associated icmp-type, you must specify the icmp-type along with the icmp-code. In place of the numeric value, you can specify one of the following text synonyms (the field values also listed); the keywords are grouped by the ICMP type with which they are associated: Parameter-problem: ip-header-bad(0), required-option-missing(1) Redirect: redirect-for-host (1), redirect-for-network (2), redirect-for-tosand- host (3), redirect-for-tos-and-net (2) Time-exceeded: ttl-eq-zero-during-reassembly(1), ttl-eq-zero-during-transit(0) Unreachable: communication-prohibited-by-filtering(13), destination-hostprohibited(10), destination-host-unknown(7), destinationnetwork- prohibited(9), destination-network-unknown(6), fragmentation-needed(4), host-precedence-violation(14), hostunreachable(1), host-unreachable-for-TOS(12), networkunreachable(0), network-unreachable-for-TOS(11), portunreachable(3), precedence-cutoff-in-effect(15), protocolunreachable(2), source-host-isolated(8), source-route-failed(5)
ip-tos:	IP TOS field. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): minimize-delay 16 (0x10), maximize-reliability 4(0x04), minimize-cost2 (0x02), and normal-service 0(0x00).
dscp	Differentiated Service Code Point. The DiffServ protocol uses the type of service (TOS) byte in the IP header, and the most significant six bits of this type form the DSCP. In place of the numeric value, you can specify one of the following text synonyms (the field values are also listed): The Expedited Forwarding RFC defines one code point: ef(46) The Assured Forwarding RFC defines 4 classes, with 3 drop precedences in each class, for a total of 12 code points: af11(10), af12(12), af13(14), af21(18), af22(20), af23(22), af31(26), af32(28),af33(30), af41(34), af42(36), af43(38).

Action Modifier Selection Panel

This panel allows you to select from a list of action modifiers. If the match condition is evaluated TRUE then the action modifiers specified are executed. You have a choice of several action modifiers:

count:

Increments the counter named in the action modifier (ingress only). A number of packet statistics are gathered by the XOS kernel. To allow you to use these statistics in CLEAR-Flow expressions, these kernel counters are now available for use with CLEAR-Flow. Most of the counter names are based directly on well known names from common kernel structures and MIBs. The names are modified from their familiar form by prepending the characters sys_ to the counter names.

Available Counters:

sys_IpInReceives - The total number of input IP packets received from interfaces, including those received in error.

sys_IpInHdrErrors - The number of input IP packets discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, timeto- live exceeded, errors discovered in processing their IP options, etc.

sys_IpInAddrErrors - The number of input IP packets discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported Classes (for example, Class E).

sys_IpForwDatagrams - The number of input IP packets for which this entity was not their final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination.

sys_IpInUnknownProtos - The number of locally-addressed IP packets received successfully but discarded because of an unknown or unsupported protocol.

sys_IpInDiscards - The number of input IP packets for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space). Note that this counter does not include any IP packets discarded while awaiting re-assembly.

sys_IpInDelivers - The total number of input IP packets successfully delivered to IP user-protocols (including ICMP).

sys_IpOutRequests - The total number of IP packets which local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any IP packets counted in ipForwDatagrams.

sys_IpOutDiscards - The number of output IP packets for which no problem was encountered to prevent their transmission to their destination, but which were discarded (for example, for lack of buffer space). Note that this counter would include IP packets counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.

sys_IpOutNoRoutes - The number of IP packets discarded because no route could be found to transmit them to their destination. Note that this counter includes any packets counted in ipForwDatagrams which meet this `no-route' criterion.

sys_IpReasmTimeout - The maximum number of seconds which received fragments are held while they are awaiting reassembly at this entity.

sys_IpReasmReqds - The number of IP fragments received which needed to be reassembled at this entity.

sys_IpReasmOKs - The number of IP packets successfully re-assembled.

sys_IpReasmFails - The number of failures detected by the IP re-assembly algorithm (for whatever reason: timed out, errors, etc.). Note that this is not necessarily a count of discarded IP fragments since some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.

sys_IpFragOKs - The number of IP packets that have been successfully fragmented at this entity.

sys_IpFragFails - The number of IP packets that have been discarded because they needed to be fragmented at this entity but could not be, for example, because their Don't Fragment flag was set.

sys_IpFragCreates - The number of IP packet fragments that have been generated as a result of fragmentation at this entity.

sys_IcmpInMsgs - The total number of ICMP messages which the entity received. Note that this counter includes all those counted by icmpInErrors.

sys_IcmpInErrors - The number of ICMP messages which the entity received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.).

sys_IcmpInDestUnreachs - The number of ICMP Destination Unreachable messages received.

sys_IcmpInTimeExcds - The number of ICMP Time Exceeded messages received.

sys_IcmpInParmProbs - The number of ICMP Parameter Problem messages received.

sys_IcmpInSrcQuenchs - The number of ICMP Source Quench messages received.

sys_IcmpInRedirects - The number of ICMP Redirect messages received.

sys_IcmpInEchos - The number of ICMP Echo (request) messages received.

sys_IcmpInEchoReps - The number of ICMP Echo Reply messages received.

sys_IcmpInTimestamps - The number of ICMP Timestamp (request) messages received.

sys_IcmpInTimestampReps - The number of ICMP Timestamp Reply messages received.

sys_IcmpInAddrMasks - The number of ICMP Address Mask Request messages received.

sys_IcmpInAddrMaskReps - The number of ICMP Address Mask Reply messages received.

sys_IcmpOutMsgs - The total number of ICMP messages which this entity attempted to send. Note that this counter includes all those counted by icmpOutErrors.

sys_IcmpOutErrors - The number of ICMP messages which this entity did not send due to problems discovered within ICMP such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IP to route the resultant datagram. In some implementations there may be no types of error which contribute to this counter's value.

sys_IcmpOutDestUnreachs - The number of ICMP Destination Unreachable messages sent.

sys_IcmpOutTimeExcds - The number of ICMP Time Exceeded messages sent.

sys_IcmpOutParmProbs - The number of ICMP Parameter Problem messages sent.

sys_IcmpOutSrcQuenchs - The number of ICMP Source Quench messages sent.

sys_IcmpOutRedirects - The number of ICMP Redirect messages sent.

sys_IcmpOutEchos - The number of ICMP Echo (request) messages sent.

sys_IcmpOutEchoReps - The number of ICMP Echo Reply messages sent.

sys_IcmpOutTimestamps - The number of ICMP Timestamp (request) messages sent.

sys_IcmpOutTimestampReps - The number of ICMP Timestamp Reply messages sent.

sys_IcmpOutAddrMasks - The number of ICMP Address Mask Request messages sent.

sys_IcmpOutAddrMaskReps - The number of ICMP Address Mask Reply messages sent.

sys_IcmpInProtoUnreachs - The number of incoming ICMP packets addressed to a not-in-use/ unreachable/ invalid protocol. This message is in the general category of ICMP destination unreachable error messages.

sys_IcmpInBadLen - The number of incoming bad ICMP length packets.b

sys_IcmpInBadCode - The number of incoming ICMP packets with a bad code field value.

sys_IcmpInTooShort - The number of incoming short ICMP packets.

sys_IcmpInBadChksum - The number of incoming ICMP packets with bad checksums.

sys_IcmpInRouterAdv - The number of incoming ICMP router advertisements. Router advertisements are used by IP hosts to discover addresses of neighboring routers.

sys_IcmpOutProtoUnreachs - The number of outgoing ICMP packets addressed to a not-in-use/ unreachable/ invalid protocol. This message is in the general category of ICMP destination unreachable error messages.

sys_IcmpOutRouterAdv - The number of outgoing ICMP router advertisements. Router advertisements are used by IP hosts to discover addresses of neighboring routers.

sys_IgmpInQueries - The number of Host Membership Query messages that have been received on this interface.

sys_IgmpInReports - The number of Host Membership Report messages that have been received on this interface for this group address.

sys_IgmpInLeaves - The number of incoming IGMP leave requests. sys_IgmpInErrors - The number of incoming IGMP errors.

sys_IgmpOutQueries - The number of Host Membership Query messages that have been sent on this interface

sys_IgmpOutReports - The number of Host Membership Report messages that have been sent on this interface for this group address.

sys_IgmpOutLeaves - The number of outgoing IGMP leave requests.

cvid:

Modifies the C-VID value. In the field, the value must be a positive integer number.

link-aggregation-hash:

Controls which link is used by matching VMAN traffic (egress only). In the field, the value must be a positive integer number.

qosprofile:

Forwards the packet to the specified QoS profile (ingress only). The profile name must be one of the default profiles. Values of “QP1” to “QP8” are allowed.

scos:

Modifies the S-COS value. In the field, the value must be a positive integer number.

stag-ethertype:

Modifies the VMAN Ethertype value, also called the S-Tag value. In the field, the value must be a positive integer number.

svid:

Modifies the S-VID value. In the field, the value must be a positive integer number.

traffic-queue:

Places the traffic on the specified traffic-queue (Black Diamond 12804R only)

uplinkport:

Modifies the uplink port. In the first field, enter “tagged” or “untagged” or leave it empty for all traffic. In the second field, enter a single number or a list separated by commas.

redirect:

Used to redirect packets (BlackDiamond 10K and BlackDiamond 12804 Only). Packets are forwarded to the IPv4 address specified, without modifying the IP header. The IPv4 address must be in the IP ARP cache, otherwise the packet is forwarded normally. Only fast path traffic can be redirected. This capability can be used to implement Policy Based Routing. You may want to create a static ARP entry for the redirection IP address, so that there will always be a cache entry.

mirror:

Sends a copy of the packet to the monitor (mirror) port (ingress only).

mirror-cpu:

Mirrors a copy of the packet to the CPU in order to log it.

replace-dscp:

Replace the packets DSCP field with the value from the associated QoS profile.

replace-dot1p:

Replace the packets 802.1p field with the value from the associated QoS profile.

log:

Logs the packet header.

log-raw:

Logs the packet header in hex format.

meter:

The meter keyword allows you to associate a meter with an ACL. The meter must be created outside of the EPM using the command line.

True Action Selection Panel

This panel allows you to select from a list of actions for the compare TRUE condition. If the match conditions are evaluated TRUE, then the actions specified here are executed.

permit	Changes the existing ACL to permit. All packets that match the conditional statements of the specified ACL are allowed to pass to their destinations.
deny	Changes the existing ACL to deny. All packets that match the conditional statements of the specified ACL are dropped.
qosprofile	Modifies an existing ACL to set the QoS profile for traffic that matches that rule.
mirror	This action modifies an existing ACL rule to mirror traffic that matches that rule, or to stop mirroring that traffic. The mirroring port must be enabled when mirroring on an ACL rule is turned on. This could be configured earlier, or use the CLI action to execute CLI commands to configure mirroring at the same time.
cli	This action executes a CLI command. There is no authentication or checking the validity of each command. If a command fails, the CLI will log a message in the EMS log. The message (FieldOne) must be placed in quotes.
snmptrap	This action sends an SNMP trap message to the trap server, with a configurable ID and message string, when the rule is triggered. The message is sent periodically with interval <period> seconds. If <period> is 0, or if this optional parameter is not present, the message is sent only once when the rule is triggered. The interval must be a multiple of the rule sampling/evaluation interval, or the value will be rounded down to a multiple of the rule sampling/ evaluation interval. The message (FieldTwo) must be placed in quotes.
syslog	This action sends log messages to the ExtremeXOS EMS sever. The possible values for message level are: DEBU, INFO, NOTI, WARN, ERRO, and CRIT. The message is sent periodically with interval <period> seconds. If <period> is 0, or if this optional parameter is not present, the message is sent only once when the rule is triggered. The interval must be a multiple of the rule sampling/evaluation interval, or the value will be rounded down to a multiple of the rule sampling/evaluation interval. The messages are logged on both MSMs, so if the backup log is sent to the primary MSM, then the primary MSM will have duplicate log messages. The message (FieldOne) must be placed in quotes.

Match Condition Selection Panel

This panel allows you to select from a list of match conditions.

global-rule	The global-rule statement is optional and affects how the counters are treated. An ACL that defines counters can be applied to more than one interface. In the original release of CLEAR-Flow, however, any counters used in an expression were only evaluated for that particular interface that the CLEAR-Flow rule was applied to. Beginning with the ExtremeXOS 11.2 release, you can specify the global-rule statement so that counters are evaluated for all the applied interfaces. For example, if a policy that defines a counter is applied to port 1:1 and 2:1, a CLEAR-Flow rule that used the global-rule statement would sum up the counts from both ports. Without the global-rule statement, the CLEAR-Flow rule would only look at the counts received on one port at a time.

count	A CLEAR-Flow count expression compares a counter with the threshold value. Beginning in ExtremeXOS release 11.4, the value of <countThreshold> and <hysteresis> can be specified as floating point numbers. The count statement specifies how to compare a counter with its threshold. The <counterName> is the name of an ACL counter referred to by an ACL rule entry and the <countThreshold> is the value compared with the counter. The REL_OPER is selected from the relational operators for greater than, greater than or equal to, less than, or less than or equal to (>, >=, <, <=). The hysteresis <hysteresis> statement is optional, and sets a hysteresis value for the threshold. After the count statement is true, the value of the threshold is adjusted so that a change smaller than the hysteresis value will not cause the statement to become false. For statements using the REL_OPER > or >=, the hysteresis value is subtracted from the threshold; for < or <=, the hysteresis value is added to the threshold.
delta	A CLEAR-Flow delta expression computes the difference from one sample to the next of a counter value. This difference is compared with the threshold value. Beginning in ExtremeXOS release 11.4, the value of <countThreshold> and <hysteresis> can be specified as floating point numbers. The delta expression specifies how to compare the difference in a counter value from one sample to the next with its threshold. The <counterName> is the name of an ACL counter referred to by an ACL rule entry and the <countThreshold> is the value compared with the difference in the counter from one sample to the next. The REL_OPER is selected from the relational operators for greater than, greater than or equal to, less than, or less than or equal to (>, >=, <, <=).
ratio	A CLEAR-Flow ratio expression compares the ratio of two counter values with the threshold value. Beginning in ExtremeXOS release 11.4, the value of <countThreshold> and <hysteresis> can be specified as floating point numbers, and the ratio is computed as a floating point number. The ratio statement specifies how to compare the ratio of two counters with its threshold. The value of <counterNameA> is divided by the value of <counterNameB>, to compute the ratio. That ratio is compared with the <countThreshold>. The REL_OPER is selected from the relational operators for greater than, greater than or equal to, less than, or less than or equal to (>, >=, <, <=). The min-value statement is optional, and sets a minimum value for the counters. If either counter is less than the minimum value, the expression evaluates to false. If not specified, the minimum value is 1.
delta-ratio	A CLEAR-Flow delta-ratio expression is a combination of the delta and ratio expressions. The CLEAR-Flow agent computes the difference from one sample to the next for each of the two counters. The ratio of the differences is then compared to the threshold value. Beginning in ExtremeXOS release 11.4, the value of <countThreshold> and <hysteresis> can be specified as floating point numbers, and the delta-ratio is computed as a floating point number. The delta-ratio statement specifies how to compare the ratio of the counter differences with its threshold. The difference of the sample values of <counterNameA> is divided by the difference of the sample values of <counterNameB>, to compute the ratio that is compared with the <countThreshold>. The REL_OPER is selected from the relational operators for greater than, greater than or equal to, less than, or less than or equal to (>, >=, <, <=).
rule-true-count	A CLEAR-Flow rule-true-count expression compares how many times a CLEAR-Flow rule is true with a threshold value. One use is to combine multiple rules together into a complex rule. The rule-true-count statement specifies how to compare how many times a CLEAR-Flow rule is true with the expression threshold. The <ruleName> is the name of the CLEAR-Flow rule to monitor and the <countThreshold> is the value compared with the number of times the rule is true. The REL_OPER is selected from the relational operators for greater than, greater than or equal to, less than, or less than or equal to (>, >=, <, <=).

B Troubleshooting

Introduction

This appendix includes suggestions for dealing with problems that may occur when running the Extreme Networks Policy Manager (EPM). They are categorized as follows:

- Connectivity Problems on page 77
- EXOS Compatibility Problems on page 77
- Local Client Runtime Problems on page 78
- Rule and Policy Version Problems on page 78
- SSH Problems on page 78

Connectivity Problems

When there is failure opening or saving policy file on a switch, check the following:

- Check the network connection to the switch by pinging the switch
- Check that the local IP address is correct.
- Check that the NAT address is set if the client is on the outside of a NAT.
- Check that the TFTP server is running on the client and listing on port 69.
- Check that the file staging directory is set to the TFTP server's root directory.
- Check that the user running the EPM has read/write permission to the TFTP server's root directory.
- Check the client firewalls
- Check that the SSH image is loaded and that it has been enabled.
- Check the user name and password. They are case-sensitive.
- Check the default routes on the switch and client.

EXOS Compatibility Problems

When the policy file loads with an exception or with rules that are disabled, check the following:

- If there is an exception, attempt to reload the policy file.
- Look at connectivity problems
- In the case of a disabled rule, check to see if the rule contains rule pneumonics that might not be supported by the EPM until an upgrade of EPM is produced. The customer can save the policy; however, the rules will be commented out.

Local Client Runtime Problems

When the EPM becomes unresponsive or does not launch, check the following:

- Verify that the client has at least 1 GB of memory. The EPM requires up to 512 MB of available memory but functions better with 1 GB.
- Terminate any other applications that may be consuming memory and restart the EPM. Verify that it executes correctly.
- Verify that the CPU is not "swamped" with other intensive processing tasks. Reduce the other tasks and restart the EPM. Verify that the EPM executes correctly.

Rule and Policy Version Problems

When the policy does not support CLEAR-Flow, check the following:

- Verify that the user specified version 3 when opening an external policy file. If not, reopen the policy with the correct version.
- Verify that the policy file looks like a reasonable Extreme policy file.

SSH Problems

When the EPM has connection problems, use the following procedure.

To display the status of SSH process:

1 telnet/ssh to the switch

2 `show process exsshd`

To start SSH process on the switch

1 telnet/ssh to the switch

2 `start process exsshd`

To terminate SSH process on the switch

1 telnet/ssh to the switch

2 `terminate process exsshd graceful`

To terminate and restart SSH process during a software upgrade on the switch

1 telnet/ssh to the switch

2 `restart process exsshd`

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